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ABSTRACT

The intent of this study was to describe low-wage, low-skill workers within the context of their work environment and to develop techniques to measure the effects of Skill Advancement's skill training program on the participants. Due to the lack of research findings in this area, these research efforts were somewhat exploratory in nature, particularly during the first year of the project. The statistical technique used in this procedure was analysis of variance and the experimental design was the Solomon Four-Group Design. A pilot study was also conducted relating to the question of pretest variables as predictors of later training success on the job. Factor analysis was the technique applied for studying predictive validity. This report is divided into three volumes. This document is Volume I, which presents information on data collection procedures, methods and results, and a summary. Volume II contains 12 statistical tables, which include data on job search behavior, factor analysis, and analysis of variance, and is available as VT 010 819. Volume III, a modified employee interview schedule and supervisor interview schedule, as available as VT 010 820. (Author/BC)

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SKILL ADVANCEMENT INC.

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# A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING

## VOLUME I: FINAL REPORT

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Contract No. OSMP 82-34-67-10

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# A STUDY OF LOW-WAGE WORKERS AND THEIR RESPONSE TO HIGH INTENSITY TRAINING

by

Earl E. Davis

## VOLUME I: FINAL REPORT

Contract No. OSMP 82-34-67-10
Office of Manpower Policy, Evaluation and Research
U. S. Department of Labor

Skill Advancement Inc.
663 Fifth Avenue
New York, New York 10022

Sponsors:

New York State School of
Industrial and Labor Relations
at Cornell University
New York Urban League
Puerto Rican Forum, Inc.

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# PREFACE

This document represents the Final Report of the research undertaken by Skill Advancement Inc. (SAI) under contract with the Office of Manpower Policy, Evaluation and Research (OMPER) of the U. S. Department of Labor (Contract No. OSMP 82-34-67-10). The initial contract commenced September 1, 1966 and ended August 31, 1967. Because of certain unavoidable difficulties, it was not possible to complete the research and prepare a final report by the end of the first contract year. Thus, DOL accepted a Preliminary Report* and extended support for the research into the 1967-68 contract year.

The present author assumed a major responsibility for the study on October 2, 1967. On May 1, 1968 he assumed full responsibility as Principal Investigator and has continued to function in this capacity beyond the extension of DOL support, which lasted until November 30, 1968. Thus, although the present research is, in many respects, substantively different from the previous research, and reflects the basic orientation and methodology of the present author, it presents also, in part, a continuation of a study started before the present author became associated with it.

The fact that the research has extended over some time and has involved considerable turnover in staff makes it difficult, at best, to adequately assign credit where it is due. Nevertheless, I would like to attempt to express my gratitude to those members of the staff, present and past, who have contributed in an important way to the study.

I am very indebted to the present members of SAI's Executive Staff. I want particularly to thank the Executive Director, Mr. Augustin Rivera, and the Deputy Executive Director, Miss Ethel M. George, for their advice and encouragement as well as for their patience and unfaltering support in the face of many difficulties; without this support it would not have been possible to complete this final document. Also, I wish to express my thanks to Mr. Samuel J. Negron, present Director of Training, as well as the other members of the training staff for their excellent cooperation; Mr. Negron was particularly helpful in his collaboration on the predictive validity aspect of the study. I would also like to express my appreciation to Mrs. Joan A. Lawrence, Director of Finance, for her essential role in seeing to it that the research effort was sustained through to its completion, and to Mr. Garland Patton, Special Assistant to the Executive Director, for his pertinent comments on various aspects of the research.

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*Volume III: "The Low-Wage Employee in His Work Environment: A Study in Depth (Preliminary Findings)" is part of the 4 volume report, Upgrading the Low-Wage Worker: An Ergonomic Approach, Technical Memorandum ADM 400, New York: Skill Advancement Inc., August, 1967.

To the members of the research staff, who were responsible for the day to day implementation of the research effort, goes my special thanks. Margret Fine made invaluable contributions, combining many functions, primary of which were those of research assistant and editor. Miss Fine assumed overall supervision of the document on June 3, 1968 and, in addition to assisting in many other ways, she edited all of the document and prepared the draft form of the summary. The other research assistants who aided in the study included Omar Bordatto, Nancy Ehrlich, Robert Sennhauser and Joyce Wackenhut; Mr. Bordatto was particularly helpful in seeing the computer analyses through to completion. Charity Carney and Genoveva Clemente functioned as interviewers and coders. Paul O'Neill and Mitchell Robin were most helpful in the design and implementation of the section on predictive validity; Mr. O'Neill also helped in the drafting of the chapter on predictive validity. Isadore Newman was instrumental in assisting in the statistical analyses of the section on the analysis of change. Katherine Kurtz performed indispensable services as computer consultant; without her help it would not have been possible to complete the extensive computer analyses. Patricia Shintani, who functioned as research secretary until May 31, 1968, had overall supervision of the typing and production of the document and assisted in numerous other ways. Additional secretarial help was provided by Marjorie McMorris, Marily Reagan and Judy Wisshack, as well as by a number of other secretaries on the SAI staff, all of whom I wish to thank very much. Calvin Banks and John Gary admirably carried out the difficult task of production.

During the first year the study was under the acting directorship of Dr. Benjamin B. Ringer. Dr. Ringer was aided in the construction of the interview schedules, which form the data base for the study, by Mr. Frank Castro, Jr. and Dr. Eleanor Gilpatrick The Preliminary Report referred to above was written by Dr. Ringer with the aid of Mr. Castro. Mr. Castro also supervised the collection of the interview data in the field as well as the in-house coding and preparation of the data for processing. He continued to carry out these duties during the first eight months of the second year of the study. He also collaborated in the design and implementation of the research in its modified form. Regrettably, due to a prior commitment, Mr. Castro had to leave the study in April, 1968, before the analysis, interpretation and write-up the results were completed. Mr. Castro was responsible for drafting much of Chapter I, the Introduction.

In addition to the previous research staff, I would like to thank the past administration of SAI, Dr. Samuel B. Marks, Executive Director during the early stages of the study, and Mr. Norman Goldberg, for their aid in facilitating the research.

Finally, I would like to thank officials of the Department of Labor for their support and patience in the face of difficulties which delayed the completion of this document.

July 10, 1969
New York, New York

Earl E. Davis, PhD
Director of Research

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* * *

# I. GENERAL INTRODUCTION

## A. Background of the Project

With the passage of the Manpower Development and Training Act in 1962 and the Economic Opportunities Act of 1964, additional mechanisms were provided by the United States Government to help in developing the capacities and capabilities of all its people. Generally, the programs developed under this legislation focused on the training and education of economically and socially disadvantaged youth, school drop-outs, displaced workers and urban and rural unemployed people. Minimal attention was given to the problems of the low-wage, low-skill workers who were already a part of the nation's labor force.

The problems with which low-wage, low-skill workers are confronted and the need for government-sponsored programs addressed to this population, were recognized early by three established organizations in New York City: the New York State School of Industrial and Labor Relations of Cornell University, the New York

Urban League and the Puerto Rican Forum, Inc.

During recent years it has become increasingly apparent to these organizations that unskilled workers, many of whom are Negro migrants from the South and Puerto Ricans, were becoming trapped in their jobs at the lowest occupational levels of industry. They worked long hours at tedious and menial jobs for which they received minimal wages which could not cover their basic living expenses. It was the consensus of these three organizations that urban low-wage, low-skill workers, specifically in New York City, who live on the fringe of poverty, were in critical need of practical vocational programs to help them break through the vicious circle of poverty. To this end, the three organizations resolved to jointly create a nonprofit corporation whose major concern would be to provide vocational training and upgrading to unskilled, underemployed working adults.

Under the joint sponsorship of the New York State School of Industrial and Labor Relations of Cornell University, the New York Urban League, and the Puerto Rican Forum, Inc.

Skill Advancement, Inc. (SAI) was formed on March 16, 1966. It was charged with the responsibility for research, development and implementation of a program designed to upgrade unskilled workers through training, planned in cooperation with the trainees' employers and unions.

In order to achieve this goal, two major efforts were identified by SAI as pre-requisite. The first effort was essentially diagnostic in nature, i.e. to make an assessment of unskilled workers' needs for training and upgrading and their employers' needs for more skilled manpower. The second effort was to design a model for an effective training program to increase the occupational skills of low wage workers and, therewith, the marketability of their skills.

SAI received an initial grant of $80,000 from the New York City Anti-Poverty Operations Board under the title of "Project Advance." With these funds,SAI undertook a survey among New York City employers and began designing a pragmatic training and upgrading program. Employers in five major New York City industries, which were characterized by good growth potential and which employed large numbers of low-wage, low-skill workers, were selected for study. The industries represented were: Hospitals, Plastics, Electrical Components, Restaurants and Retail Groceries. The concern of the survey was to assess the extent and practice of upgrading and training in each of these industries.

The Project Advance survey showed that there was a surplus of unskilled workers with a low level of formal education, working at the most menial, low-paying jobs, barely able to cover minimal living expenses. Paradoxically, employers also reported that they were unable to fill critically important job vacancies because of a severe shortage of semi-skilled, skilled, and supervisory personnel. Despite the availability of better paying jobs, Project Advance found that unskilled workers were confined to the lowest level jobs because they lacked the necessary skills for upward occupational mobility, and that they had no feasible training opportunities for obtaining these skills.

It was further learned that employers provided little or no opportunity for training or advancement. They lacked the time, money and technical competence to develop and implement formal training programs. Furthermore, because of negative stereotypic views of low-wage workers generally, and of racial and cultural minorities in particular, many employers failed to see that among these low-wage workers there was a great deal of manpower potential for more responsible positions.

On the basis of these findings, SAI focused attention on developing a training and upgrading methodology which would solve these manpower problems, thus making it possible for low-skill, low-wage workers to move into job vacancies at higher pay, within their own organizations. In addition to its immediate value to trainees, such training would help to alleviate skill shortages and labor bottlenecks in industry, and would simultaneously create entry-level job vacancies for new entrants into the labor force.

In order to meet these objectives quickly and effectively, the training program would have to be compressed into a minimal period of time. Thus, SAI designed and conducted an experimental "high intensity" upgrading training program for unskilled workers at a major New York City medical center. This model proved to be the innovative, pragmatic training solution that was sought. The model was called High Intensity Training (HIT).

The HIT model was developed and refined to include the following elements:

- -An HIT program is conducted within a plant setting with selected low-skill, low-wage employees of the organization.
- -A Training Agreement is entered into between the employer interested in HIT and SAI to ensure that trainees are upgraded to more responsible jobs, given a new job title and receive an 8 to 10 per cent wage increase immediately after completing the training.
- -Union and management officials assist in the screening and selection of trainees and are encouraged to participate in the training program.

-An HIT program is relatively short in duration to ensure continued interest and participation of the trainees and provide quickly achievable rewards for trainees and management. A typical HIT program is 40 hours in length; it consists of 20 two-hour training sessions over a five-week period. The length of any specific program, however, depends upon the complexity of the target job.

-Trainees are paid for the time they spend in training. When training sessions are given after regular work hours, trainees receive overtime pay.

-A training curriculum is designed to meet the particular manpower needs of an organization and considers the needs of the workers and their employer.

-An HIT program considers the worker within the context of his total environment which includes work, home and community.

-SAI professional trainers serve as catalytic instruments; working in the plant setting, they help to "unfreeze" negative attitudes that management and supervisors frequently have toward low-skill workers.

- An HIT program is designed to develop technical skills and human relations skills of the low-wage worker.
- An HIT program builds work-group cohesiveness and motivates low-skill, low-wage workers to seek more responsibility.
- The HIT curriculum also includes personal development sessions and basic education. These are designed to raise the worker's level of aspiration and to build the self-esteem, confidence and motivation necessary to encourage him to go beyond the job for which he is being trained.

High Intensity Training programs, in sum, were designed to help the low-skill worker become occupationally mobile; to give him greater control over his own destiny in his home, with his family, and with respect to his economic needs.

At the same time, the HIT package was designed to secure private sector commitment to training and upgrading its own employees. In the final analysis, it is often the private sector that is best able to reach and train the low-wage worker; and it is the private sector that will share in the rewards of more efficient utilization of the nation's human resources.

The results of these early program and survey efforts and recommendations are reported in Breaking the Barriers of Occupational Isolation: A Report on Upgrading Low-Skill, Low Wage Workers; Findings and Recommendations for the City of New York. (SAI, New York, July 1966). On the basis of this report and the serious social problems which were documented, the New York City Anti-Poverty Operations Board extended SAI's initial contract for several additional months in order to keep its professional staff intact until operating funds could be obtained from another source.

With the encouragement of the New York City Anti-Poverty Operations Board, SAI applied to the U.S. Department of Labor (DOL) for funds to conduct an Experimental and Demonstration project that would utilize its newly developed High Intensity Training concept to upgrade larger numbers of low-skill, low-wage employees in the New York City area. In addition, SAI proposed to conduct a research project designed to study the work attitudes and behavior of low-wage, low-skill workers in order to gain new insights into the problems of manpower development.

In light of the recognized critical need to assist low-wage workers throughout the nation to improve their work skills and their earning power, the Office of Manpower Policy, Evaluation and Research (OMPER) of the U.S. Department of Labor contracted with SAI to develop innovative methods of achieving this objective through a one-year Experimental and Demonstration project commencing September 1, 1966, and ending August 31, 1967. The objective of the project as stated in the contract was to:

> Plan, develop and demonstrate means of aiding and encouraging employers to establish upgrading programs to enable low-skill workers already employed to advance to higher skill jobs.

In carrying out this commitment, SAI agreed to train and upgrade 1,500 low-skill, low-wage workers in hospitals, plastics and allied industries, using the High Intensity Training model developed in Project Advance.

In addition, SAI undertook to design and implement a two-fold research project. One research study was designed to assess the effects of formal in-plant training programs on workers and their organizations; the other study was directed to the identification of new industries for the introduction of formal upgrading training programs.

A comprehensive, four-volume report of SAI training and research activities during the 1966-1967 contract year, Phase I, was submitted to the Office of Manpower Policy, Evaluation and Research, United States Department of Labor during August, 1967, under the title of: Upgrading the Low-Wage Worker: An Ergonomic Approach. The contents of the four volumes are briefly sketched below.

Volume I contained an overview of training and research activities and a management report on project administration.

Volume II was concerned with the development and implementation of the innovative High Intensity Training concept, and reported achievements of the past year and areas for further development during Phase II of the SAI program. The report is subtitled "Upgrading Low-Wage Workers in the Plant Environment Through High Intensity Training."

Volume III discussed the research design and preliminary findings of the employee research study and examined the work attitudes and behavior of low-wage workers. It is subtitled "The Low-Wage Employee in His Work Environment: A Study in Depth (Preliminary Findings)."

Volume IV identified six potentially receptive industries for the introduction of upgrading programs in Phase II of SAI's training program, and traced the development of a conceptual model to identify relevant industries. This report is subtitled "Use of Job Vacancies to Select Promising Industries for Training Programs."

Because of the scope of the project and certain unavoidable technical difficulties, it was not possible to complete the research and prepare a Final Report on the Employee Research Study by August 31, 1967, the end of the first contract year. The Department of Labor accepted Volume III, reporting preliminary findings, and extended the research project into the 1967-1968 contract year.

## B. Orientation and Objectives of the Study

On the basis of careful analysis of the interview data and the research experience during the 1966-1967 contract year, it was found necessary to modify the earlier research statements and specify the methodology more precisely. A new research plan was detailed in Technical Memorandum RES 119, dated December 4, 1967, and it is on that plan that this report is based.

The restatement of the research design for the Employee Study used as points of departure the earlier research statements published regarding the intent of the research. We carefully examined the assumptions used as conceptual underpinnings and the hypotheses put forth in these statements. Certain modifications and additions were made in the basic orientation, the underlying assumptions, the hypotheses to be tested and research questions to be answered. The most significant departure from the earlier research plan was in the explicit specification of the research methodology and the statistical design of the study, as well as the decision to focus the research efforts more directly upon the training program.

The original intent of the study remained essentially the same, i.e., to describe low-wage, low-skill workers within the context of the work environment and to develop techniques to measure the effect of SAI's skill training programs upon the participants. In addition, we were interested in initiating a pilot study which could identify some of the factors predictive of trainee success. Such predictor variables could have implications not only for trainee selection but, more importantly, for determining the content and emphases of future training programs.

Thus, the three principal foci of the present research are: 1) a descriptive analysis of the subjects, 2) an analysis of the effect of the training program, and

3) an analysis of variables bearing on trainee selection and success.

In order to organically integrate the research effort with that of SAI's training program, the Employee Study adopted two major assumptions concerning research strategy which are immediately relevant to and congruent with those underlying the training program. These are as follow:

1. The aspects of daily living in our contemporary industrial society which are of key importance include both making a living, which means possessing marketable skills and capabilities, and maintaining personal adjustment, which means developing effective interpersonal skills.
2. Workers are best studied within the context of the complex work environment, rather than away from the work environment or in situations limited to workers' relations to specific jobs.

Other than these two assumptions, no strict theoretical framework was constructed to guide the investigation. We felt that to do so at this juncture would limit, prematurely, the analytic parameters. In using an *a priori* theoretical structure, there is a risk that such a structure would prove to have limited bearing on the empirical reality.

A number of research questions and hypotheses, directed toward a critical evaluation of many of the assumptions put forth by the training program developers, were formulated and discussed in the research plan mentioned earlier (Technical Memorandum RES 119). While it was not possible to test all of these on the basis of the data collected, those we were able to test will be dealt with in detail in Chapter III, Method and Results.

### C. Organization of Report

In presenting the results of a study of this sort, some difficult questions concerning the manner of presentation inevitably arise. On the one hand, there is much to be said for writing a document which describes and interprets the research results in a manner that is easily readable and readily understandable by the interested layman, with little or no presentation of technical detail. On the other hand, an argument can be made for a more complete and somewhat more technical presentation of the methodology and results of the study. Although this document hopefully will be of use to policy makers and a wide spectrum of individuals interested in manpower problems, both in the public and private sector, the report should also be of value to other researchers conducting similar studies under the auspices of the Department of Labor or other agencies. Although a general discussion and non-technical presentation of the findings may be of interest to these researchers, they would only obtain concrete benefits for their own research from a detailed presentation of the methodology, the instruments used, and the results of the statistical analyses.

After some consideration we have decided that it would be an error to limit the document to either a highly technical or a completely non-technical form. Instead, it was decided to make a serious attempt to meet the needs and requirements of both types of readers. A mere compromise of the sort that would result in a report which was too lacking in rigor and technical detail to be of value to other researchers, and yet was too technical to be easily read by the interested layman, would obviously be unsatisfactory. The path which we have chosen instead involves organizing various parts of the report in such a manner as to serve the different needs of readers.

First of all, the document is divided into three volumes. Volume I represents the final report itself. Where extensive tables were required in order to present complete findings these have been put in Volume II, Techincal Appendix A. This was done with the intention of making the Final Report as readable as possible without the distraction of extensive tables. By presenting these detailed results in Volume II, Technical Appendix A, it will be possible for the technically oriented reader to inspect in detail the findings which form the basis for conclusions or further analyses reported in Volume I. Finally, Volume III, parts 1 and 2, containing Appendices B-1, B-2, B-3, B-4 and B-5, presents the actual interview schedules used in obtaining our data. These include instructions to the interviewer and coding instructions, as well as the complete wording of the questions asked. These probably will be of interest to other researchers and may also be of interest to readers who wish to check the actual phrasing of any given question which has gone into the results reported in Volume I.

Although many of the more extensive tables have been placed in Technical Appendix A, Chapters II and III of this volume, which describe the research methodology and present the findings and results, will contain selected tables which explicate and document the findings. These tables are always accompanied by text explaining their meaning and calling the attention of the reader to those results which are most important. Also, whenever abbreviations or symbols have been used, these have been explained in footnotes the first time they appear.

Chapter IV, which is written in relatively non-technical fashion, is a complete summary of the study, including a recapitulation of the findings and results. It also contains conclusions, policy recommendations and other implications of the results. The reader who is not interested in extensive technical details could easily proceed at this point to Chapter IV.

With these guides, it is hoped that this report will be of interest to a wide range of persons concerned with both action and research in this critical area.

* * * *

# II. DATA COLLECTION PROCEDURES

## A. Overview

Our data base consisted of the responses to rather extensive, structured interview schedules, which contained questions concerning demographic and other background variables, as well as a large number of questions relating to reported behaviors, motivations, aspirations, perceptions, attitudes and values of the subjects.

The interviewees were low-skill, low-wage employees and their first-line supervisors. All interviews were conducted during working hours, individually and in private, by trained interviewers on the job site. The average interview schedule took 1½ hours to complete.

The interview schedules covered the following major areas:

1. Past and present occupational experience: the kinds of jobs the respondent has held, the tasks performed, the types of companies for which he

has worked, and frequency of job changes.

2. Educational and vocational training: a history of the respondent's formal schooling and participation in training programs, the amount and kinds of such schooling and training.
3. Demographic information: age, sex, family income, race and national origin.
4. Job satisfaction in reference to current job and occupational status: what respondent finds most and least satisfying about his work, how important he finds his job, etc.
5. Level of aspiration and respondent's assessment of his chances to attain these aspirations: the kind of work he would most like to do, the kind of job he expects to have five years from now, his satisfaction or dissatisfaction with his present wages and his future wage expectations.
6. Expressed interest in participating in an upgrading training program: general interests as well as interest and willingness to participate under a variety of conditions, such as studying at home, assuming more responsibilities, etc.

7. Attitudes toward work, toward management and toward the organization: feelings of company loyalty or estrangement, attitudes toward fairness of treatment, etc.
8. Attitudes toward and relations with other employees in the organization: attitudes toward and perceptions of peers, superiors, and subordinates.
9. Self image: attitudes of self competence and self respect, perceptions of self with respect to others, and of others' perceptions of him.
10. General world view: attitudes toward society, social problems, interpersonal and intergroup relations and the like.

Somewhat different forms of the same basic interview schedule were used for employees and for supervisors. The pre-test and post-test interview schedules differed from each other only to the extent that biographical and other demographic data were not added a second time; instead, the post-test contained additional items relevant to the training program. A somewhat different version of the basic interview schedule was used during the first year of the project (1966-67) from that used during the second year (1967-68). These different versions are summarized in the following section.

## B. Measuring Instruments

In the course of the development of the measuring instrument during the year 1966-67, a preliminary version of the pre- and post-test interview schedules for employees and supervisors was tested at one particular firm(Manufacturing Firm Z, described in the next section). On the basis of the preliminary results a revised version of the interview schedule was developed. It is this revised version which constituted the basic measuring instrument during this period. Phase I refers to the pre-test instrument, and Phase II refers to the post-test instrument. The four interview schedules used during this period, together with their abbreviations, may be listed as follows:

Employee Phase I, Revised Version - ERI
Employee Phase II, Revised Version - ERII
Supervisor Phase I, Revised Version - SRI
Supervisor Phase II, Revised Version - SRII

The complete form of these revised interview schedules has been presented in previous reports (see Technical Memorandum RES 014, Appendices A and B and Technical Memorandum RES 014a, Appendices C and D).

During the year 1967-68, a modified version of the Employee and Supervisor Pre- and Post-Test Interview Schedules was developed and administered to additional employees and supervisors. A number of considerations led to this supplemental data collection. The original interview schedule had several shortcomings. The schedule itself proved to be too lengthy and cumbersome. In addition, many of the questions were asked in such a way as to yield responses which provided only nominal categories, thus limiting the analyses to the most rudimentary statistical treatment. A more careful re-structuring of the questions and their associated response categories made it possible to obtain information which could be placed on an ordinal scale, thus permitting the use of more advanced statistical techniques.

The four forms of this modified interview schedule, together with their abbreviations, are listed below:

Employee Phase I Modified Version - EMI
Employee Phase II Modified Version - EMII
Supervisor Phase I Modified Version - SMI
Supervisor Phase II Modified Version - SMII

The complete form of the Modified Employee Pre- and Post-Test Interview Schedules is contained in Volume III, Part I, of this Report (Appendices B-1 and B-2). The Modified Supervisor Pre- and Post-Test Interview Schedules are contained in Volume III, Part 2 (Appendices B-3 and B-4).

## C. Subjects and Organizations Studied

Altogether, a total of 437 employees and 91 first-line supervisors were interviewed with the Pre-test instrument. In addition, 229 of the employees and 53 of the supervisors were administered the Post-test interview, resulting in a total of 810 completed interview protocols. The subjects came from seven different hospitals and four manufacturing firms in the greater New York area. Before presenting a detailed breakdown of subject characteristics by organization, we will describe briefly the organizations involved.

## 1. Organizations Studied

Hospital A was founded in 1887 by a religious order of a major denomination. Originally located in Manhattan, the hospital moved to the Bronx in 1958 and presently occupies rather modern quarters. In 1963, the hospital added two floors to one of its wings; this increased its bed capacity to 331, thereby enabling the hospital to care for 3,000 additional patients each year.

The hospital maintains a school of nursing with an enrollment of 150 students and a shelter for unwed mothers and their infants. It is also a teaching hospital which offers a variety of residency programs.

Most of the employees interviewed at Hospital A were Nurses' Aides. Their duties included sterilizing and arranging instruments, bringing water and food to patients, taking temperatures, taking blood to the lab, etc. A few of the interviewees were Ward Clerks who participated in the training program.

Hospital B is a veteran's hospital that has 1,331 beds. It is on a site formerly occupied by an orphanage which was sold to the United States Government in 1922. In 1940 two additional buildings were added, thereby making the complex already in existence into one extended hospital building.

Hospital B has achieved national and international recognition for the quality of its patient care and for its teaching and research activities. It is affiliated with several major medical schools, and most of its staff members hold faculty appointments at the medical schools.

The employees interviewed worked in the housekeeping department and were Housekeeping Aides. Their duties included dusting, scrubbing, mopping and waxing floors, changing bedsheets, etc.

Hospital C is a large general hospital, with 585 beds, run by a county in Metropolitan New York. It sprawls over a vast area and consists of a number of specialized departments. Some of the interviewees were Housekeeping

Aides. Their duties were the same as those described for Housekeeping Aides at Hospital B. Others were Laundry Aides with duties including washing and ironing linen and arranging for its dispersal to all departments in the hospital. The rest were Dietary Aides. Their job consisted of washing plates, cleaning up in the cafeteria, setting tables, etc.

Hospital D is one of the nation's leading medical treatment, training and research centers and has grown from a modest beginning in Manhattan in 1884 to a complex which now occupies seven city blocks and is one of the largest employers in the Bronx. It is the principal voluntary hospital affiliated with one of the major medical colleges in New York City. It also is affiliated with a city hospital which is not connected with a medical school. This partnership has been very successful and has set an example that other hospitals have followed.

The interviews in this hospital were conducted in the nursing and out-patient departments. The employees interviewed were Ward Secretaries whose functions are to answer phones, keep records, make appointments for clinical patients, etc.

Hospital E has been in operation for over 100 years. Located on an island off Manhattan, this institution had been known by many names, including the "Island Hospital" and the "Penitentiary Hospital". Its reputation was poor in spite of the great need for hospital services. Over the years improvements were initiated. In 1964 a major voluntary hospital of high standing in the City entered into a contract of affiliation with New York City. Under this contract, the voluntary hospital assumed the responsibility for staffing this 950 bed city hospital.

A dramatic display of the impact of the affiliation was the rise in quality and quantity of the available diagnostic and therapeutic services.

Our interviews were conducted among employees in the housekeeping department. They were Housekeeping Aides and their duties are comparable to those of Housekeeping Aides in the other hospitals.

Hospital F is a 268 bed voluntary, non-profit, general hospital. The hospital now operates approximately 50 clinics in its comprehensive out-patient department. This out-patient department operates approved State-aided programs for 13 different types of rehabilitative services for children, and has become a referral center for the care of physically and emotionally handicapped youngsters.

Hospital F is a primary affiliate of a medical college which is part of the State University of New York. It is also affiliated with a school of dentistry of a major university in New York City.

In February, 1964, under a contract with the City of New York, Hospital F undertook an affiliation with a city hospital medical center and assumed responsibility for provision of medical services and direction of graduate medical and dental education at this major municipal center, which has some 1300 beds.

The complex array of patient services, educational programs and research activities carried out by Hospital F has resulted in its becoming a major medical center for the entire Queens-Nassau-Suffolk area. This has been coupled with a significant increase in the demand for care at Hospital F. The hospital has embarked on a $15,000.000 program that will increase the bed capacity from 268 to 450, including a 20-bed inpatient unit for short-term psychiatric care.

Ware Clerks and Ward Secretaries were interviewed in this hospital. Their major jobs consisted of filling out charts, keeping other records, handling paperwork in general and answering phones.

Hospital G located in Harlem was opened in 1887. The physical plant consisted of a leased three-story building with a bed capacity of 54 patients.

In 1917, Hospital G hired several Negro nurses with the result that many of the white nurses resigned. On January 1, 1923 a training school for Negro nurses was established at Hospital G. The school steadily grew in size and stature. Its admitting policy was later changed to include qualified applicants, regardless of race.

On January 7, 1933 the National Association for the Advancement of Colored People invited a group of laymen, educators, clergymen and physicians to form a committee for the purpose of investigating Hospital G because they realized the role it could play in the training of Negro physicians. The NAACP submitted a significant report, including recommendations for opportunities for Negro medical students, aided by funds from the Carnegie Corporation.

The progress of integration continued to the extent that in the middle forties the professional staff leveled off at about 50% Negro and 50% white, a ratio roughly maintained at the present time.

In 1963 Hospital G became affiliated with the medical school of a major university in the City.

Scheduled to open in 1968, the New Main Building of

Hospital G is to be a 22 story, 902 bed general hospital. There will be facilities for clinical, laboratory and animal research as well as the operative, medical and radio-therapeutic management of clinical cases. This new addition will make Hospital G one of the key medical centers in New York City's system of municipal hospitals.

At Hospital G the employees interviewed were Ward Clerks. Their duties included typing daily schedules, maintaining records, taking messages, and answering phones.

Manufacturing Firm W is engaged primarily in custom molding of plastic products for several large companies. They also manufacture their own line of plastic jugs. Their plastic spools and boxes are sold to a wide variety of industries including cosmetics, fishing tackle and pharmaceuticals.

The employees interviewed in this company are Floormen, who are assistants to the men who run the molders. Floormen mix colors, take work out of the pressroom and help put the molds into the machines.

Manufacturing Firm X is an electronics firm which has been in existence for ten years and has been part of a larger corporation since 1967. The Company makes many different instruments used to aid in the rescue of pilots and individuals who find themselves in difficulty at high sea because of accident or aerial attack.

The employees who were interviewed were Wirers and Assemblers who were engaged in cleaning batteries, applying labels and cutting wires to specified lengths.

Manufacturing Firm Y has grown from a small compounding and trading operation to one of the foremost manufacturers of color concentrates and compounders of formulas of a highly specialized nature. By the early 1950's, the owners of the firm purchased a molding power company and became one of the pioneers in reprocessing scrap materials into colored compounds.

During the busy season there are 46 workers in the Production Department; however, at the time of the interviews, there were only 17 workers in this department. Most of those interviewed are involved either as Operators or as Helpers on banbury production or extruder machines and perform semi-skilled duties.

Manufacturing Firm Z was organized 20 years ago as a manufacturer of small plastic toys and novelties. For the past 14 years, it has been making double wall plastic cups and glassware which have become the firm's major products.

During the peak season as many as 300 to 500 persons are employed in the plant. During the off-season, the work force is cut back to about 50, a figure which prevailed at the time of this study.

Some of the employees interviewed were Floormen. Their job was to assist the machine operators, bring in material and colors and remove work from the room. Others interviewed were Machine Operators. Their duties included checking the machine, adjusting knobs for proper color control, making sure the machine did not overheat, etc. Other employees interviewed were Warehousemen in the

Shipping Department. Their tasks were to fill boxes, load and unload trucks and do related work.

## 2. Subjects and Their Characteristics

The composition of the employees who were administered the pre-test interview schedule, in terms of race or ethnicity and sex, varied greatly from one organization to another. Table 1 presents a complete breakdown of 437 pre-tested employees, in terms of ethnicity and sex, by organization.

As may be seen in the right hand column of Table 1, of the total sample approximately 28% are white, nearly 60% are Negro, slightly over 11% are Puerto Rican and less than 1% were classified as "other"(American Indian, Oriental, etc.). However, there are marked deviations from this distribution within various organizations. For instance, in Hospital G 93% of the pre-tested employees are Negro, whereas in Hospital F 78% are white. This is not suprising when we consider that Hospital G is located in a predominantly Negro residential area,whereas Hospital F is located in a predominantly white residential

TABLE 1

ETHNICITY AND SEX OF PRE-TESTED EMPLOYE

HOSPITALS

| | A | | B | | C | | D | | E | | F | | G | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | |
| 1. WHITE | | | | | | | | | | | | | | |
| MALE | 3 | | 13 | | 18 | | 0 | | 0 | | 0 | | 0 | |
| FEM. | 23 | | 3 | | 34 | | 5 | | 0 | | 14 | | 1 | |
| TOTAL | 26 | 28% | 16 | 18% | 52 | 54% | 5 | 24% | 0 | 0% | 14 | 78% | 1 | 3 |
| 2. NEGRO | | | | | | | | | | | | | | |
| MALE | 3 | | 45 | | 21 | | 1 | | 1 | | 0 | | 0 | |
| FEM. | 60 | | 7 | | 24 | | 14 | | 0 | | 2 | | 28 | |
| TOTAL | 63 | 67% | 52 | 59% | 45 | 46% | 15 | 71% | 1 | 17% | 2 | 11% | 28 | 9 |
| 3. PUERTO RICAN | | | | | | | | | | | | | | |
| MALE | 0 | | 20 | | 0 | | 0 | | 5 | | 0 | | 0 | |
| FEM. | 5 | | 0 | | 0 | | 1 | | 0 | | 0 | | 1 | |
| TOTAL | 5 | 5% | 20 | 23% | 0 | 0% | 1 | 5% | 5 | 83% | 0 | 0% | 1 | 3 |
| 4. OTHER | | | | | | | | | | | | | | |
| MALE | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| FEM. | 0 | | 0 | | 0 | | 0 | | 0 | | 2 | | 0 | |
| TOTAL | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 2 | 11% | 0 | |
| TOTALS BY ORGANIZATION | 94 | 100% | 88 | 100% | 97 | 100% | 21 | 100% | 6 | 100% | 18 | 100% | 30 | 10 |

## TABLE 1

D SEX OF PRE-TESTED EMPLOYEES BY ORGANIZATION

| LS | | | | | | | MANUFACTURING FIRMS | | | | | | | | GRAND TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | E | | F | | G | | W | | X | | Y | | Z | | | |
| % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| % | 0<br>0<br>0 | 0% | 0<br>14<br>14 | 78% | 0<br>1<br>1 | 3% | 0<br>1<br>1 | 11% | 0<br>0<br>0 | 0% | 3<br>0<br>3 | 18% | 3<br>3<br>6 | 12% | 40<br>84<br>124 | 28.4% |
| % | 1<br>0<br>1 | 17% | 0<br>2<br>2 | 11% | 0<br>28<br>28 | 93% | 6<br>1<br>7 | 78% | 1<br>0<br>1 | 12% | 7<br>0<br>7 | 41% | 15<br>24<br>39 | 80% | 100<br>160<br>260 | 59.5% |
| % | 5<br>0<br>5 | 83% | 0<br>0<br>0 | 0% | 0<br>1<br>1 | 3% | 0<br>0<br>0 | 0% | 7<br>0<br>7 | 88% | 7<br>0<br>7 | 41% | 3<br>1<br>4 | 8% | 42<br>8<br>50 | 11.4% |
| % | 0<br>0<br>0 | 0% | 0<br>2<br>2 | 11% | 0<br>0<br>0 | 0% | 1<br>0<br>1 | 11% | 0<br>0<br>0 | 0% | 0<br>0<br>0 | 0% | 0<br>0<br>0 | 0% | 1<br>2<br>3 | 0.7% |
| % | 6 | 100% | 18 | 100% | 30 | 100% | 9 | 100% | 8 | 100% | 17 | 100% | 49 | 100% | 437 | 100% |

area.

In general, a higher percentage of the low-skill, low-wage employees in the manufacturing firms in our sample are members of minority groups than is the case with hospitals. However, in hospitals, too, the majority of the low-skill, low-wage workers in our sample are members of minority groups, with the exception of Hospital F to which we have already referred,and Hospital C, where there is an approximately even split.

Table 2 presents a breakdown of the 91 pre-tested supervisors by organization in terms of ethnicity and sex. An inspection of the totals in the right hand column shows a clear shift in the ethnic distribution of the supervisors in our sample when compared with the employees. As may be seen 57% of the first-line supervisors are white compared with 36% Negro and 7% Puerto Rican. Furthermore, a closer inspection reveals that the majority of the Negro supervisors are accounted for by Hospital G. In this case, the supervisors are registered nurses; as we have already mentioned , Hospital G, which

TABLE 2

## ETHNICITY AND SEX OF PRE-TESTED SUPERVISO

HOSPITALS

| | A | | B | | C | | D | | E | | F | | G | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | |
| 1. WHITE | | | | | | | | | | | | | | |
| MALE | 0 | | 3 | | 3 | | -- | | 0 | | 0 | | 0 | |
| FEM. | 12 | | 0 | | 7 | | -- | | 0 | | 10 | | 0 | |
| TOTAL | 12 | 92% | 3 | 37% | 10 | 77% | -- | | 0 | 0% | 10 | 100% | 0 | 0% |
| 2. NEGRO | | | | | | | | | | | | | | |
| MALE | 0 | | 2 | | 0 | | -- | | 0 | | 0 | | 2 | |
| FEM. | 1 | | 2 | | 3 | | -- | | 1 | | 0 | | 19 | |
| TOTAL | 1 | 8% | 4 | 50% | 3 | 23% | -- | | 1 | 33% | 0 | 0% | 21 | 10 |
| 3. PUERTO RICAN | | | | | | | | | | | | | | |
| MALE | 0 | | 1 | | 0 | | -- | | 2 | | 0 | | 0 | |
| FEM. | 0 | | 0 | | 0 | | -- | | 0 | | 0 | | 0 | |
| TOTAL | 0 | 0% | 1 | 13% | 0 | 0% | -- | | 2 | 67% | 0 | 0% | 0 | |
| 4. OTHER | | | | | | | | | | | | | | |
| MALE | 0 | | 0 | | 0 | | -- | | 0 | | 0 | | 0 | |
| FEM. | 0 | | 0 | | 0 | | -- | | 0 | | 0 | | 0 | |
| TOTAL | 0 | 0% | 0 | 0% | 0 | 0% | -- | | 0 | 0% | 0 | 0% | 0 | |
| TOTALS BY ORGANIZATION | 13 | 100% | 8 | 100% | 13 | 100% | -- | | 3 | 100% | 10 | 100% | 21 | 10 |

TABLE 2

ICITY AND SEX OF PRE-TESTED SUPERVISORS BY ORGANIZATION

| HOSPITALS | | | | | | | | MANUFACTURING FIRMS | | | | | | | | GRAND TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | | E | | F | | G | | W | | X | | Y | | Z | | | |
| N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| -- | | 0 | | 0 | | 0 | | 6 | | -- | | 3 | | 8 | | 23 | |
| -- | | 0 | | 10 | | 0 | | 0 | | -- | | 0 | | 0 | | 29 | |
| -- | | 0 | 0% | 10 | 100% | 0 | 0% | 6 | 75% | -- | | 3 | 60% | 8 | 80% | 52 | 57% |
| -- | | 0 | | 0 | | 2 | | 0 | | -- | | 1 | | 0 | | 5 | |
| -- | | 1 | | 0 | | 19 | | 0 | | -- | | 0 | | 2 | | 28 | |
| -- | | 1 | 33% | 0 | 0% | 21 | 100% | 0 | 0% | -- | | 1 | 20% | 2 | 20% | 33 | 36% |
| -- | | 2 | | 0 | | 0 | | 2 | | -- | | 1 | | 0 | | 6 | |
| -- | | 0 | | 0 | | 0 | | 0 | | -- | | 0 | | 0 | | 0 | |
| -- | | 2 | 67% | 0 | 0% | 0 | 0% | 2 | 25% | -- | | 1 | 20% | 0 | 0% | 6 | 7% |
| -- | | 0 | | 0 | | 0 | | 0 | | -- | | 0 | | 0 | | 0 | |
| -- | | 0 | | 0 | | 0 | | 0 | | -- | | 0 | | 0 | | 0 | |
| -- | | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | -- | | 0 | 0 % | 0 | 0% | 0 | 0% |
| -- | | 3 | 100% | 10 | 100% | 21 | 100% | 8 | 100% | -- | | 5 | 100% | 10 | 100% | 91 | 100% |

is located in Harlem , has a high percentage of Negro professional staff as well as Negro employees at other levels. Adjusting for the anomalous case of this one organization, a clear picture emerges of predominantly white first-line supervisors in charge of low-skill, low-wage employees who are mostly Negro and Puerto Rican. This fact will be of relevance in considering some of our findings and results.

Although we have collected data on both employees and their first-line supervisors, more detailed analyses have been conducted with the employee data. This is both because of the main focus of the study, which is on the low-wage, low-skill worker and his response to High Intensity Training, and because of the relatively larger number of employee interview protocols which we were able to gather. We will, however, present and discuss the results of some analyses comparing supervisors with employees in the next chapter.

It may be useful to present some further information in addition to ethnicity and sex concerning our sample of employees before proceeding with a discussion of the findings and results. Table 3 presents the mean age, the mean length of time in present job and the mean weekly take-home pay of employees by organization. Although there is a fair degree of variation in the distribution of these characteristics among subjects in different organizations, the results in Table 3 allow certain generalizations about our sample. The mean age of the subjects indicates that most of them are not new to the labor market but have been in it for a number of years. Most of the subjects are in their thirties or early forties. When one considers that most employees in this age range have families to support, the mean weekly take-home pay, which ranges from $55 to $83,takes on added significance. In addition, one must consider the cost of living in New York City, which is among the highest in the nation.

The mean length of time in present job indicates that most of the subjects have been in their present job for a rather considerable period of time; the mean for the entire sample is approximately five and one half years.

## TABLE 3

## MEAN AGE, TIME ON JOB AND WEEKLY TAKE-
## OF EMPLOYEES BY ORGANIZATION

HOSPITALS

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1. Mean age (in yrs.) | 34.1 | 47.7 | 38.8 | 30.8 | 32.3 | 46.4 |
| 2. Mean length of time in present Job (years) | 3.33 | 7.67 | 6.00 | 3.00 | 5.50 | 2.33 |
| 3. Mean Weekly take home pay | $63.72 | $70.92 | $64.44 | $66.10 | $82.50 | $64.2 |

TABLE 3

E, TIME ON JOB AND WEEKLY TAKE-HOME PAY
OF EMPLOYEES BY ORGANIZATION

| ALS | | | | | MANUFACTURING FIRMS | | | |
|---|---|---|---|---|---|---|---|---|
| C | D | E | F | G | W | X | Y | Z |
| 8.8 | 30.8 | 32.3 | 46.4 | 42.5 | 30.2 | 34.3 | 42.0 | 33.2 |
| .00 | 3.00 | 5.50 | 2.33 | 9.50 | 3.50 | 1.50 | 4.75 | 6.25 |
| 64.44 | $66.10 | $82.50 | $64.22 | $77.79 | $68.89 | $69.25 | $81.79 | $59.19 |

This characteristic of our sample must be borne in mind in considering the findings and results of this study. We are not dealing with transient, temporarily employed, low-wage workers, but rather with subjects who manifest a rather high degree of employment stability. The relationship between this relatively long period of time in their present job and the mean weekly take-home pay is striking. The original concern of the project that many unskilled workers are trapped in their jobs at the lowest occupational level, receiving minimal wages which do not cover basic living expenses, seems to be reflected in these data obtained from the employees in our sample.

In the preceding section we described briefly the organizations from which our sample of employees was drawn. At that time we gave a very brief narrative description of the jobs which the employees who were interviewed held in each organization. In order to obtain a more complete picture of the subjects and their characteristics it might be useful to give some quantitative information about the subjects in each organization in terms of the jobs which they held. Quantitative indices for describing the characteristics of various jobs are provided by the results of research carried out by the United States Employment Service which is reflected in the classification of occupations in the Third Edition of the Dictionary of Occupational Titles (DOT) of the Bureau of Employment Security of the United States Department of Labor.[1] Two measures that are used in the DOT classification of occupations are designed to assess "the amount of general educational development and specific vocational preparation required for a worker to acquire the knowledge and abilities necessary for average performance in a particular job."[2] General Educational Development (GED) as defined in the DOT

> embraces those aspects of education (formal and informal) which contribute

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[1] Dictionary of Occupational Titles, Volume I, Bureau of Employment Security, Manpower Administration, United States Department of Labor: Washington, D.C., 1965 (Third Edition).

[2] *Ibid.*, Volume II, p.651

> to the worker's (a) reasoning development and ability to follow instructions, and (b) acquisition of 'tool' knowledge such as language and mathematical skills. It is education of a general nature which does not have a recognized fairly specific occupational objective. Ordinarily such education is obtained in elementary school, high school or college. It also derives from experience and individual study.[3]

Specific Vocational Preparation (SVP) refers to

> the amount of time required to learn the techniques, acquire information, and develop the facility needed for average performance in a specific job-worker situation. This training may be acquired in a school, work, military, institutional or avocational environment. It does not include orientation training required even of every fully qualified worker to become accustomed to the special conditions of any new job.[4]

For both the GED and SVP there is a range from 1 to 6, with higher scores indicating a higher level on each measure. Table 4 presents the mean GED and SVP scores of employees by organization. As may be seen on both of

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[3] Ibid ., Volume II, p. 651.

[4] Ibid., Volume II, p.652.

## TABLE 4

### GED AND SVP SCORES OF EMPLOYEES

HOSPITALS

| Mean Score on Measure of: | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| General Educational Development (GED) | 2.97 | 2.05 | 2.33 | 3.00 | 2.00 | 3.00 | 3.00 |
| Specific Vocational Preparation (SVP) | 3.68 | 2.11 | 2.52 | 3.00 | 2.00 | 3.00 | 3.00 |

## TABLE 5

### LEVEL OF COMPLEXITY OF EMPLOY

Three Relationships Represente

HOSPITALS

| Mean Level of Complexity of Job in Relation to: | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| Data | 7.31 | 8.00 | 7.64 | 3.00 | 8.00 | 3.00 | 3.00 |
| People | 7.12 | 8.00 | 7.64 | 8.00 | 8.00 | 8.00 | 8.00 |
| Things | 7.97 | 6.92 | 6.49 | 8.00 | 7.00 | 8.00 | 8.00 |

TABLE 4

GED AND SVP SCORES OF EMPLOYEES BY ORGANIZATION

| HOSPITALS | | | | | MANUFACTURING FIRMS | | | |
|---|---|---|---|---|---|---|---|---|
| C | D | E | F | G | W | X | Y | Z |
| 2.33 | 3.00 | 2.00 | 3.00 | 3.00 | 2.33 | 3.00 | 2.82 | 2.04 |
| 2.52 | 3.00 | 2.00 | 3.00 | 3.00 | 3.22 | 2.00 | 4.29 | 3.96 |

TABLE 5

LEVEL OF COMPLEXITY OF EMPLOYEES' JOBS BY ORGANIZATION

Three Relationships Represented in DOT Occupational Code

| HOSPITALS | | | | | MANUFACTURING FIRMS | | | |
|---|---|---|---|---|---|---|---|---|
| C | D | E | F | G | W | X | Y | Z |
| 7.64 | 3.00 | 8.00 | 3.00 | 3.00 | 6.67 | 6.00 | 6.82 | 7.78 |
| 7.64 | 8.00 | 8.00 | 8.00 | 8.00 | 7.22 | 8.00 | 7.71 | 7.96 |
| 6.49 | 8.00 | 7.00 | 8.00 | 8.00 | 5.67 | 7.00 | 2.82 | 4.65 |

these measures, our subjects are in the low-medium range but not necessarily at the lowest points on these two indices.

In addition to the GED and SVP associated with any given occupation, the classification scheme contained in the DOT provides a measure of the level of complexity involved in a given occupation as determined by the nature and character of its relationship to Data, People and Things. Each of these three relationships is measured independently; in this case, the more complex the relationship the lower the score value. These values can range from 0 to 8 for each of the three relationships; these rankings are represented by the last three digits of the six digit occupational code used in the Dictionary of Occupational Titles.

The DOT provides the following rationale for this threefold classification on each of these dimensions:

> 1. Every job requires the worker to function in relation with Data, People and Things in varying degrees.

2. The relationship specific to Data, People and Things can be arranged in each case from the simple to the complex in the form of a hierarchy so that generally each successive function can include the simpler ones and exclude the more complex functions.

3. It is possible to express a job's relationship to Data, People and Things by identifying the highest appropriate function in each hierarchy to which the job requires the worker to have a significant relationship.[5]

Table 5 presents the mean level of complexity of employees' jobs by organization in terms of these three relationships represented in the DOT occupational code. As an inspection of Table 5 reveals, most of the jobs held by the employees in our sample reflect a rather low level of complexity. An exception is the somewhat greater level of complexity with respect to Things found in the manufacturing firms as might be expected.

The above description of subjects and organizations studied served merely the function of identifying the source of the data collected in this study. In the following chapter we will present a much more detailed descriptive analysis of the subjects and of the important inter-relationships among the variables.

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[5] Ibid., Volume I, p. XVIII.

* * * *

# III. METHOD AND RESULTS

## A. Descriptive Analysis of Subjects and Variables

### 1. Background Variables of Subjects

#### a. Formal Education

In the course of describing the organizations and subjects studied in the preceding chapter, we presented information on the jobs held by the employees in each organization in terms of the two quantitative indices of General Educational Development (GED) and Specific Vocational Preparation (SVP), based on the classification of occupations in the Dictionary of Occupational Titles.[6] The GED levels reported in Table 4 (p.47) do not reflect the empirical data collected on our sample of subjects, but refer merely to the general level of educational development (both formal and informal) associated with the job involved, as determined by previous research carried out by the Bureau of Employment Security of the United

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[6] Ibid.

States Department of Labor.

Our interview schedules contained questions designed to elicit information concerning the number of years of formal education actually completed by the subjects (Employee Q.78, Supervisor Q.60; Volume III, Parts 1 & 2, Appendices B-1 & B-3). Although it can be argued that such information which is provided by the respondent is not as reliable as official records (which were not available to us), an effort was made to elicit this information with care. Thus, subjects were asked not only to indicate the number of years of formal education which they had completed, but were further asked whether the last year mentioned had been completed. In cases where the last year mentioned had not been completed, the interviewer made the appropriate change in the response to the previous question.

One would expect to find a difference in the formal educational level of low-wage, low-skill workers and their supervisors; and, indeed, our data show that such differences exist. Table 6 presents a comparison of employees and

TABLE 6

COMPARISON OF EMPLOYEES AND SUPERVISORS IN TERMS OF M
FORMAL EDUCATION COMPLETED BY JOB TITLE AND ORGAN

HOSPITALS

| | | A | | B | | C | | D | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SUPERVISORS | | N | $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ | N |
| | | 13 | 14.77 | 8 | 10.00 | 13 | 11.31 | - | - | 3 |
| | Job Title | Head Nurses | | Housekeeping Supervisors | | Chief Housekeepers | | --- | | Hous<br>Assis<br>Supe |
| EMPLOYEES | | N | $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ | N |
| | | 92 | 10.82 | 87 | 8.62 | 94 | 9.22 | 21 | 11.23 | 6 |
| | Job Title | Nurses' Aides | | Housekeeping Aides | | Housekeeping, Laundry and Dietary Aides | | Ward Secretaries | | Hous<br>Aide |

N=Number of Subjects; $\overline{X}$=Arithmetic Mean

TABLE 6

ND SUPERVISORS IN TERMS OF MEAN YEARS OF
LETED BY JOB TITLE AND ORGANIZATION

HOSPITALS

| | D | | E | | F | | G | | TOTAL HOSP | |
|---|---|---|---|---|---|---|---|---|---|---|
| $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ |
| 1.31 | - | - | 3 | 7.33 | 9 | 13.11 | 21 | 13.57 | 67 | 12.60 |
| s | --- | | Housekeeping Assistant Supervisor | | Unit Exec.'s | | Head Nurses | | | |
| $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ | N | $\overline{X}$ |
| .22 | 21 | 11.23 | 6 | 8.85 | 17 | 11.76 | 14 | 11.78 | 331 | 9.87 |
| g,<br>d<br>es | Ward Secretaries | | Housekeeping Aides | | Ward Clerks | | Ward Clerks | | | |

ts; $\overline{X}$=Arithmetic Mean (continued)

TABLE 6 (continued)

MANUFACTURING FIRMS

| | | W | | X | | Y | | Z | | T |
|---|---|---|---|---|---|---|---|---|---|---|
| SUPERVISORS | | N | $\bar{X}$ | N | $\bar{X}$ | N | $\bar{X}$ | N | $\bar{X}$ | N |
| | | 8 | 11.62 | - | - | 5 | 9.00 | 10 | 11.30 | 23 |
| | Job Title | Foreman | | -- | | Foreman | | Managers;<br>Floor Lady | | |
| EMPLOYEES | | N | $\bar{X}$ | N | $\bar{X}$ | N | $\bar{X}$ | N | $\bar{X}$ | N |
| | | 8 | 9.87 | 8 | 8.0 | 17 | 7.64 | 48 | 9.77 | 81 |
| | Job Title | Floormen | | Wirers and Assemblers | | Floormen | | Floormen;<br>Machine Operators | | |

TABLE 6 (continued)

| Z | | TOTAL MFG | | GRAND TOTAL HOSP & MFG FIRMS | | GRAND TOTAL W/O HEAD NURSES | |
|---|---|---|---|---|---|---|---|
| N | $\bar{X}$ | N | $\bar{X}$ | N | $\bar{X}$ | N | $\bar{X}$ |
| 10 | 11.30 | 23 | 10.91 | 90 | 12.17 | 56 | 11.09 |
| Managers;<br>Floor Lady | | | | | | | |
| N | $\bar{X}$ | N | $\bar{X}$ | N | $\bar{X}$ | N | $\bar{X}$ |
| 48 | 9.77 | 81 | 9.16 | 412 | 9.73 | 412 | 9.73 |
| Floormen;<br>Machine Operators | | | | | | | |

supervisors in terms of the mean years of formal education completed, with a breakdown by organization and job title. The first page of Table 6, which presents this information for hospitals, shows that there is a mean difference between employees and supervisors of approximately 2 3/4 years, with supervisors having the higher level of education. The second page of Tabel 6, which presents this information for the manufacturing firms, indicates that, although supervisors still have a higher level of education than employees, the mean difference here is considerably less, amounting to only 1 3/4 years. A comparison of the means based on the grand total of supervisors and employees in hospitals and manufacturing firms shows an overall difference of slightly less than 2½ years. However, if we look at the data for individual organizations we find an anomalous situation in the cases of Hospitals A and G where the supervisors of the employees studied were Head Nurses. A considerably higher level of education is required to become a Registered Nurse (approximately 3 years post high school). However, this education is primarily of a professional and technical nature and is not as directly related to the supervisory function as would be the case with other supervisors in the hospitals or in manufacturing firms. Thus, when we adjust for this anomaly, the overall difference between the educational levels of supervisors and employees is considerably less. As the last column of Table 6 shows, when we remove the Head Nurses from the total, the difference between supervisors and employees in terms of mean years of formal education completed is only approximately 1 1/3 years. Although this difference is still statistically significant, it is nonetheless rather small when one considers the differential prestige and benefits associated with the positions of the low-skill, low-wage employees and that of their supervisors. Indeed in one instance, namely in the case of Hospital E, the mean level of education of the employees is somewhat higher than that of the supervisors. Although the number (N) of subjects involved here is quite small, so that statements of statistical significance are not possible, such findings do suggest the need for further research in this area. At any rate, the relatively small mean difference of 1 1/3 years of formal education between employees and supervisors, when an adjustment for the case of the Head Nurses at these two hospitals is made, would seem to indicate that differences in formal education do not necessarily constitute a major, and certainly not insurmountable, difficulty in the training of low-wage, low-skilled employees for upgrading to higher positions. Even if this difference were greater, the relevance of formal education to the tasks that must be performed in the target jobs is still quite open to question.

In considering the question of formal education, we were also interested in possible differences between ethnic groups. As we summarized in Table 1 (p. 38 ), of the more than 400 employees who were administered pre-test interview schedules, approximately 28% were White, 60% Negro and 11% Puerto Rican, with less than 1% "Other". We will focus our attention on ethnic differences among the employees, since of the 91 supervisors who were pre-tested the overwhelming majority were White, with the exception of the Head Nurses at Hospital G who were all Black.

Table 7 presents a comparison of White and Negro workers in years of formal education completed. When considering all of the employees for whom we have complete data on this variable, we find that the mean($\overline{X}$) for Whites is 9.36 years

## TABLE 7

### COMPARISON OF WHITE AND NEGRO WORKERS IN YEARS OF FORMAL EDUCATION COMPLETED

Total Sample of Employees

| White (N=134) | | Negro (N=236) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 9.36 | 2.42 | 10.10 | 2.71 | -.74 | 368 | 2.652** |

## TABLE 8

### COMPARISON OF WHITE AND PUERTO RICAN WORKERS IN YEARS OF FORMAL EDUCATION COMPLETED

Total Sample of Employees

| White (N=134) | | Puerto Rican (N=42) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 9.36 | 2.42 | 9.07 | 2.98 | .29 | 174 | .640 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\overline{X}$ = Arithmetic Mean
S.D.= Standard Deviation

and the mean for Negroes is 10.10 years. This results in a mean difference of approximately three quarters of a year. Although this difference may not seem huge, it is statistically very significant as a mean difference between groups for whom we have a relatively large N. In addition to the means for the two groups, Table 7 also presents the standard deviation (S.D.) for each group as a measure of variation. In a normal distribution two-thirds of the subjects fall within one standard deviation above or below the mean. This means, therefore, that although the mean difference is only three-quarters of a year, many Negro subjects in our sample have an educational level which differs even more in the upward direction from the mean for White subjects. Conversely, of course, some White subjects will show an educational level above that of the mean for Negro subjects. In considering the statistical significance of the mean difference between two groups we take into consideration not only the means and standard deviations for the two groups but also the degrees of freedom (df). The degrees of freedom relates to the N for each of the two groups and is usually calculated by the formula $N_1 + N_2 - 2$.

The t-value indicated in Table 7 is merely an index, based on a certain sampling distribution, to be used in determining the level of statistical significance of the difference between the means of two groups. A given t-value, together with a given df, may be looked up in an appropriate table (e.g. Fisher and Yates, 1963) to determine the level of statistical significance. In this particular case the significance level of $p < .01$ indicates that the probability that the mean difference between these two groups could come about by chance is less than one in a hundred.

Numerous authors (e.g. Kahn, 1964) have shown that for identical levels of education Negro workers have lower-level jobs and/or earn less than their White counterparts. Such statistics can also be interpreted to mean that for a given job and/or wage level Negro workers have a higher level of education than their White counterparts. However, these findings have usually been made on the basis of Bureau of Labor Statistics findings which take into account all regions of the country. In certain areas of the country discrimination in employment on the basis of race is still quite blatant, and it has sometimes been assumed that these findings are accounted for largely on the basis of such regional differences. Also, previous findings have taken into account all levels of education and all job levels. It is of some interest, therefore, that our findings confirm these previous results. This is especially so when we consider that the region we are dealing with is the greater New York City area, which is widely presumed to be relatively freer of racial discrimination in employment than other areas of the country, and when we consider that the subjects are low-wage, low-skill workers of whom one would expect a generally low level of education, with little differentiation among groups of subjects.

Table 8 presents a similar comparison of White and Puerto Rican workers in our sample. As may be seen from Table 8, the Puerto Rican subjects have a mean of 9.07 years of formal education completed, which does not significantly differ from the mean for White subjects. However, no conclusion can be drawn from this lack of significance, particularly in light of the fact that the number of Puerto Rican subjects in our sample is relatively small.

Although, our sample of subjects consists of low-wage low-skill workers, it is true that not all of the workers are at the very lowest skill level, as we have indicated in our discussion of the mean GED and SVP scores in Table 4 (page 47). With this in mind, we re-analyzed the data to see if, when an even more stringent criterion of "low-skill" is applied, the differences reported in Table 7 would disappear. Thus we selected out those subjects who, on the basis of the DOT code attached to their job title, fell into the most unskilled category, and again examined the possibility of group differences. At this lowest skill level the educational level of the subjects is rather low and one reaches a certain "floor" effect which makes it much less likely that one would find any significant differences. Also, since we are dealing with a smaller N for each group, and consequently a smaller df, from a purely statistical point of view, the possibility of finding significant differences is greatly diminished. Table 9 presents a comparison of

## TABLE 9

## COMPARISON OF WHITE AND NEGRO WORKERS IN YEARS OF FORMAL EDUCATION COMPLETED

### Selected Employees in Lowest Skill Level

| White (N=59) | | Negro (N=93) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 8.54 | 2.47 | 9.09 | 2.47 | -.54 | 124 | $1.32^{+}$ |

## TABLE 10

## COMPARISON OF WHITE AND PUERTO RICAN WORKERS IN YEARS OF FORMAL EDUCATION COMPLETED

### Selected Employees in Lowest Skill Level

| White (N=59) | | Puerto Rican (N=20) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 8.54 | 2.47 | 8.40 | 2.98 | 0.14 | 28 | 0.19 |

$^{+}p < .10$
$*p \leq .05$
$**p \leq .01$
$***p \leq .001$

$\overline{X}$ = Arithmetic Mean
S.D.= Standard Deviation

White and Negro workers who are in this lowest skill category in terms of years of formal education completed. The White subjects in this sample have a mean educational level of 8.54 years compared to a mean of 9.09 years for Negro subjects, resulting in a mean difference of slightly greater than one half-year. Thus, even in the case of this sub-sample we find a difference in the same general direction. As a matter of fact, this difference is not only in the same direction but even shows a moderate level of statistical significance ( $p < .10$).

Table 10 presents a similar comparison for White and Puerto Rican workers who are in this low-skill category. Again there is no significant difference between White and Puerto Rican subjects in our sample in terms of years of formal education completed. However, the number of Puerto Rican subjects involved here is quite small, and thus no conclusions can be drawn from this lack of significant difference.

### b. Job Search Behavior

Among the background information which we obtained from our subjects was a series of questions relating to their job search behavior, i.e. to what extent they had used various means of finding a job in the past. Specifically, they were asked if they had ever used any of the following means (Employee Q.110-118; Supervisor Q.83-91, Vol.III, Part 1, Appendix B-1 and Vol.II, Part 2, Appendix B-3). This series of questions was initiated by the following general question:

> "When people are looking for work there are different things they do to find work. Which things have you done?"

The subjects were then asked the following nine questions:

Q. 110 "Have you ever gone 'cold' to a company and asked if there was work?"

Q. 111 "Have you ever asked friends or relatives if they knew of work?"

Q. 112 "Have you asked 'around' if people knew of work?"

Q. 113 "Have you ever registered at the unemployment office (employment office, USES)?"

Q. 114 "Have you ever gone to a private employment agency?"

Q. 115 "Have you ever asked at a community agency (like church, Urban League or government agency)?"

Q. 116 "Have you ever asked local politicians?"

Q. 117 "Have you ever gone to a union to ask?"

Q. 118 "Have you ever read want ads in papers?"

For each of these nine questions, the subjects had four possible responses:

0 = No Response

1 = Yes, and landed a job

2 = Yes, but did not land a job

3 = No

There are reasons to expect differences among groups of subjects with respect to job search behavior. Certain differences between employees and supervisors were hypothesized in an earlier statement.[7] In addition we were interested in differences among subjects based on racial or ethnic identification, age, sex and length of residence in New York City.

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[7] c.f. Technical Memorandum RES 119, December 4,1967, p.1-11.

### i. Employees vs Supervisors

Tables 11a-11i present a comparison of supervisors' and workers' job search behavior in terms of the percentage of responses falling into each of the four possible response categories. For each question a chi-square analysis was performed to determine whether there were any significant differences between the two groups of subjects.[8]

In the earlier statement referred to above, it was hypothesized that supervisors would make greater use of "formal" channels of job search behavior than would employees. The underlying assumption was that the low-skill, low-wage employees in our sample would be less knowledgeable about such formal channels as employment

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[8] In each case a chi-square analysis was performed on the basis of the 2 X 4 contingency table as presented in the following pages; in this case the degrees of freedom (df) equaled 3. If the chi-square was not significant, no further analysis was necessary. If this initial analysis yielded a chi-square value which was significant beyond the .05 level, the table was reduced to a 2 X 2 contingency table by eliminating the "No Response" category (which uniformly contained a very small percentage of responses for both groups of subjects) and combining the two "Yes" categories; in this case the significance level of the chi-square was determined on the basis of df = 1.

## TABLE 11

## COMPARISON OF EMPLOYEES' AND SUPERVISORS' JOB SEARCH BEHAVIOR

a. "Going Cold to a Company" (Employee Q. 110; Supervisor Q. 83)

Percentage Responses and Chi-Square Values*

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Employees (N=346) | 0.9 | 43.1 | 12.4 | 43.6 |
| Supervisors (N=78) | 1.3 | 53.9 | 10.3 | 34.6 |

$X^2$ =1.968; df= 3;(Not Significant)

b. "Asking Friends or Relatives" (Employee Q. 111; Supervisor Q.84)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, but Didn't Land Job | No |
| Employees (N=346) | 1.2 | 49.4 | 17.3 | 32.1 |
| Supervisors (N=78) | 1.3 | 26.9 | 11.5 | 60.3 |

$X^2$=21.551; df=1; $p \leq .001$

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* Chi-Square values were computed to test the significance of differences between total frequencies of "Yes" categories and the "No" category.

TABLE 11 --- Continued

c. "Asking Around" (Employee Q. 112, Supervisor Q. 85)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Employees (N=346) | 1.2 | 20.8 | 18.8 | 59.3 |
| Supervisors (N=78) | 1.3 | 5.1 | 9.0 | 84.6 |

$X^2 = 18.114$; df=1; $p \leq .001$

d. "Registering at the Unemployment Office" (Employee Q. 113, Supervisor Q. 86)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, And Landed Job | Yes, But Didn't Land Job | No |
| Employees (N=346) | 1.2 | 32.4 | 21.7 | 44.8 |
| Supervisors (N=78) | 2.6 | 12.8 | 9.0 | 75.6 |

$X^2 = 28.158$; df=1; $p \leq .001$

TABLE 11 --- Continued

e. "Going to a Private Employment Agency" (Employee Q.114;Supervisor Q. 87)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Employees (N=346) | 1.2 | 23.4 | 9.0 | 66.5 |
| Supervisors (N=78) | 1.3 | 9.0 | 5.1 | 84.6 |

$X^2$=10.418; df=1; p≤.001

f. "Asking at a Community Agency" (Employee Q. 115; Supervisor Q. 88)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, And Landed Job | Yes, But Didn't Land Job | No |
| Employees (N = 346) | 1.2 | 7.8 | 4.6 | 86.4 |
| Supervisors (N=78) | 1.3 | 1.3 | 1.3 | 96.2 |

$x^2$=7.554; df=3; (Not Significant)

TABLE 11 -- Continued

g. "Asking Local Politicians"(Employee Q. 116; Supervisor Q. 89)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Employees (N=346) | 1.7 | 3.5 | 3.8 | 91.0 |
| Supervisors (N=78) | 1.3 | 0.0 | 0.0 | 98.8 |

$X^2$ =7.511; df=3; (Not Significant)

h. "Going to a Union" (Employee Q. 117; Supervisor Q. 90)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Employees (N=346) | 2.6 | 4.6 | 4.1 | 88.8 |
| Supervisors (N=78) | 2.6 | 1.3 | 2.6 | 93.6 |

$X^2$=3.067; df=3; (Not Significant)

TABLE 11 -- Continued

i. "Reading Want Ads" (Employee Q.118; Supervisor Q.91)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Employees (N=346) | 1.2 | 29.5 | 35.0 | 34.3 |
| Supervisors (N=78) | 1.3 | 15.4 | 32.1 | 51.3 |

$X^2=7.758$; df=1; $p \leq .01$

agencies and want ads than supervisors. Conversely, it was hypothesized that employees would make greater use of "informal" channels of job search behavior such as "Asking friends or relatives" or "Asking around."

The first hypothesis is clearly disconfirmed by our data; an inspection of Tables 11-d and 11-e shows that, contrary to this hypothesis, a significantly larger percentage of employees have made use of both public and private employment agencies than have supervisors. Other channels that might also be considered "formal" such as "Asking at a community agency" and "Asking local politicians" (Tables 11-f and 11-g) were not made use of to any significant extent by either employees or supervisors and thus there were no significant differences between the responses of these two groups. One other "formal" channel, i.e. "Going to a union" (Table 11-h) which might be expected to have been made greater use of by employees than by supervisors was also not used to any significant extent by either group, and hence, there were no significant differences between the groups. The remaining formal means, i.e. "Reading want ads" (Table 11-i) was also made greater use of by employees than by supervisors, although the difference here is not as great as in the case of the other formal means.

The second assumption that employees would use informal channels of job search behavior more frequently than supervisors is indeed borne out by the results in Tables 11-b and 11-c ("Asking friends or relatives" and "Asking around," respectively). The significance of this finding however, is mitigated by the overall finding that employees use almost all of the means of job search behavior more than do supervisors.

An exception to the above statement occurs in the case of one mode of job search behavior, i.e. "Going cold to a company" (Table 11-a). In this particular case the percentage of supervisors who indicated that they had engaged in this form of job search behavior was greater than the percentage of employees. The difference between the two groups was not statistically significant, as indicated by the chi-square value. However, since it is the only case of reversal of the trend, one may wish to speculate as to the reasons for these findings. An obvious explanation would be that supervisors possess more "self-confidence" (or less "fear" or "trepidation") than do employees and hence, are more willing to take such a direct step in seeking employment. Of course it is also quite possible that supervisors are simply more familiar with the procedures involved in "Going cold to a company." However, these are merely conjectures and a more definitive answer to this question can only be obtained through further research.

In summary, the most outstanding difference reflected in our data between the job search behaviors of supervisors and employees is that employees utilize almost all means to a greater extent than do supervisors; moreover, most of these differences are statistically significant. Table 12 illustrates this fact clearly by summarizing and simplifying the results presented in Tables 11a-11i. In Table 12 the total percentages of "Yes" responses for both employees and supervisors are presented side by side for each of the nine modes of job search behavior, together with the levels of significance of differences.

## TABLE 12

## SUMMARY COMPARISON OF SUPERVISORS' AND WORKERS' JOB SEARCH BEHAVIOR IN TERMS OF TOTAL "YES" RESPONSES

| | Empl.'s | Sup.'s | Level of Significance |
|---|---|---|---|
| "Going Cold to a Company" | 55% | 64% | N.S. |
| "Asking Friends or Relatives" | 67% | 38% | $p \leq .001$ |
| "Asking Around" | 39% | 14% | $p \leq .001$ |
| "Registering at the Unemployment Office" | 54% | 22% | $p \leq .001$ |
| "Going to a Private Employment Agency" | 32% | 14% | $p \leq .001$ |
| "Asking at a Community Agency" | 12% | 3% | N.S. |
| "Asking Local Politicians" | 7% | 0% | N.S. |
| "Going to a Union" | 9% | 4% | N.S. |
| "Reading Want Ads" | 64% | 47% | $p \leq .01$ |

N.S. = Not Significant

There are a number of possible explanations for the finding that employees use nearly all forms of job search behavior more than do supervisors. One possibility is that workers simply change their place of employment more frequently than do supervisors. This is a reasonable partial explanation since supervisors are more likely than employees to have job tenure. Another possible explanation, however, is that supervisors are more likely to have obtained their present position through promotion within the organization, whether such changes are vertical or lateral.

### ii. Ethnic and Racial Differences Among Employees

#### (a) White vs Negro Employees

In Tables 13a-13i data are presented showing a comparison between White and Negro employees' job search behavior in the same manner as in the previous set of tables which compared supervisors and workers. The most striking thing about the comparison between White and Negro workers' job search behavior is the marked similarity to the previous comparison.

Previously, we found that employees used almost all means of job search behavior more frequently than did supervisors; this disconfirmed a set of hypotheses concerning the differential use of formal and informal means of job search behavior on the part of the two groups. The findings also indicated that employees, for

TABLE 13

## COMPARISON OF WHITE AND NEGRO EMPLOYEES' JOB SEARCH BEHAVIOR

a. "Going Cold to a Company" (Employee Q. 110)

Percentage Responses and Chi-Square Values*

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| White (N=97) | 0.0 | 46.4 | 10.3 | 43.3 |
| Negro (N=201) | 0.0 | 35.3 | 16.4 | 48.3 |

$X^2$=.627; df=1; (Not Significant)

b. "Asking Friend or Relative" (Employee Q. 111)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| White (N=97) | 0.0 | 43.3 | 17.5 | 39.2 |
| Negro (N=201) | 1.5 | 48.3 | 24.4 | 25.9 |

$X^2$=5.199; df=1; $p \leq .01$

---

* Chi-Square values were computed to test the significance of differences between total frequencies of "Yes" categories and the "No" category.

TABLE 13 -- Continued

c. "Asking Around" (Employee Q. 112)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| White (N=97) | 0.0 | 16.5 | 18.6 | 64.9 |
| Negro (N=201) | 1.5 | 20.9 | 22.9 | 54.7 |

$X^2$=2.409; df=1, (Not Significant)

d. "Registering at Unemployment Office" (Employee Q. 113)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| White (N=97) | 0.0 | 21.6 | 20.6 | 57.7 |
| Negro (N=201) | 1.0 | 41.8 | 20.9 | 36.3 |

$X^2$=11.85; df=1; $p \leq .01$

TABLE 13-- Continued

e. "Going to Private Employment Agency" (Employee Q. 114)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| White (N=97) | 0.0 | 10.3 | 6.2 | 83.5 |
| Negro (N=201) | 1.0 | 29.4 | 11.4 | 58.2 |

$X^2=13.115$; df=1; $p \leq .001$

f. "Asking at Community Agency"(Employee Q. 115)

Percentage Responses and Chi-Square Values

| Subjects | Response Catergories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| White (N=97) | 0.0 | 6.2 | 3.1 | 90.7 |
| Negro (N= 201) | 1.0 | 7.0 | 1.5 | 90.5 |

$X^2=.040$; df=1; (Not Significant)

TABLE 13 --Continued

g. "Asking Local Politicians" (Employee Q. 116)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| White (N=97) | 0.0 | 4.1 | 1.0 | 94.8 |
| Negro (N=201) | 1.5 | 3.5 | 3.0 | 92.0 |

$X^2$=.226; df=1; (Not Significant)

h. "Going to a Union" (Employee Q. 117)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| White (N=97) | 1.0 | 3.1 | 3.1 | 92.8 |
| Negro (N=201) | 2.5 | 4.0 | 9.0 | 84.6 |

$X^2$=4.201; df=1; (Not Significant)

TABLE 13-- Continued

i. "Reading Want Ads" (Employee Q. 118)

Percentage Responses and Chi-Square Values

| Subjects |  | Response Categories |  |  |
|---|---|---|---|---|
|  | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| White (N=97) | 0.0 | 28.9 | 30.9 | 40.2 |
| Negro (N=201) | 1.0 | 24.4 | 42.8 | 31.8 |

$X^2$=1.850; df=1; (Not Significant)

whatever reasons, had to "work harder" at getting jobs than did supervisors. It may be that this reflects a difference between supervisors and employees in terms of relative status in the hierarchically organized "world of work."

It is, thus, quite interesting - and quite disturbing - to find that among low-skill, low-wage workers having objectively the same job status, differences similar to those found to exist between employees and supervisors are evident when comparisons are made on the basis of race. As Tables 13a-13i indicate, Negro workers use most methods of job search behavior to a greater extent than do White workers. For both groups of subjects the informal channel of "Asking friends or relatives" (Table 13-b) is the one most frequently mentioned. However, both in the case of this channel and in the case of more formal means, such as "Registering at the unemployment office" (Table 13-d), the percentage of Negro workers giving "Yes" responses is significantly greater than the corresponding percentage of White workers.

Table 14 summarizes this general finding that Negro employees use most means of job search behavior more frequently than do White employees.

TABLE 14

SUMMARY COMPARISON OF WHITE AND NEGRO EMPLOYEES' JOB SEARCH BEHAVIOR IN TERMS OF TOTAL "YES" RESPONSES

| | White | Negro | Level of Significance |
|---|---|---|---|
| "Going Cold to a Company" | 57% | 52% | N.S. |
| "Asking Friends or Relatives" | 61% | 73% | $P \leq .01$ |
| "Asking Around" | 35% | 44% | N.S. |
| "Registering at the Unemployment Office" | 42% | 63% | $P \leq .01$ |
| "Going to a Private Employment Agency" | 16% | 41% | $P \leq .001$ |
| "Asking at a Community Agency" | 9% | 8% | N.S. |
| "Asking Local Politicians | 5% | 6% | N.S. |
| "Going to a Union" | 6% | 13% | N.S. |
| "Reading Want Ads" | 60% | 67% | N.S. |

In looking at Table 14, it is interesting to note that of all the means of job search behavior "Going to a Private Employment Agency" differentiates most significantly between White and Negro employees, with Blacks using this means far more frequently than Whites. This suggests at least the possibility of some form of "exploitation," since such private agencies typically charge a fee to the applicant. The situation that is being exploited is one in which, as was already pointed out, Black workers have to use most means of seeking employment more than do White workers, indicating that in some sense Blacks have to "try harder."

It might be noted that this finding is in general quite consistent with the findings reported earlier to the effect that Negroes have a higher level of education for the same job level as White workers.

If our interpretation of the foregoing data is correct, then we must seek some explanation for the higher frequency of job search behaviors on the part of Black workers as compared with White workers. One obvious possible explanation would be that Black workers simply change jobs more frequently, i.e. represent an "unstable" work force. In the next section which presents some detailed results on comparisons between Black and White workers on frequency of job changes and other aspects of occupational mobility, no significant differences were found to exist between Black and White workers with respect to frequency of job changes. This explanation then, is apparently ruled out as a cause for the more frequently reported job search behavior on the part of Black employees..

A rather logical explanation that has been suggested from many quarters is that some forms of discrimination, based on race, are operating in the area of employment. Although our study was not conducted primarily to explore this question, and thus our data may not be conclusive, a close inspection of the results is suggestive of this explanation.

One indicator of possible discrimination may be seen in differences within the two "Yes" response categories. This can be exemplified by an inspection of Table 13-a ("Going cold to a company"). As we indicated earlier, and as Table 14 shows, White workers had a slightly though not significantly higher percentage of "Yes" responses to this question than did Negro workers.

However, a detailed inspection of Table 13-a shows that 46% of White workers used this method and "landed a job" whereas 10% used the method and "didn't land a job." This compares with 35% of Negro respondents who used this method and "landed a job" and 16% who used it and "didn't land a job." Put in other terms, this means that of the White workers who used this method 82% "landed a job," whereas of the Negro workers who used this method only 68% "landed a job." Although this difference is not statistically significant, it suggests a trend which should be further explored.

Another method of seeking employment which could reflect employer discrimination is "Reading want ads," since success in finding a job by this means must ultimately bring employer and employee face to face. As summarized in Table 14, 67% of Negro respondents, compared with 60% of White respondents, reported using this means of job search behavior. Of greater interest, however, is a detailed inspection of Table 13-i which shows that 29% of the Whites used this method and "landed a job" and 31% used it but "didn't land a job"; this compares with

24% of Negro respondents who used the method and "landed a job" and 43% who used it but "didn't land a job." Put in other terms, of Whites who used this method 48% "landed a job" and 52% did not, whereas for Negroes who used this method 36% "landed a job" and 64% did not. This difference is not only a trend but approaches an acceptable level of statistical significance ($\chi^2 = 2.42$, $p \leq .15$).

When this same sort of analysis is applied to Table 13-d ("Registering at the unemployment office") an interesting reversal seems to appear. Thus, although Negro employees use this means of finding employment significantly more frequently than do Whites, as may be seen in Table 14, a detailed examination of Table 13-d shows that of the Negro employees who used this method 67% were successful in finding a job whereas 33% who used this method "did not land a job." The comparable figures for White respondents who used this method show that 51% "landed a job" and 49% did not. This difference is statistically significant by chi-square analysis ($\chi^2 = 4.59$; $p \leq .05$) in the direction of Negro workers being more "successful" at landing a job than are White workers. Does this mean that employment offices - and here we are dealing with the United States Employment Service and the New York State Employment Service - engage in "negative discrimination," i.e. give preferential treatment to Negro applicants? This is, of course, a possible explanation. However, a familiarity with the practices prevalent in these agencies suggests the possibility that an alternate mechanism is operating. It may be that Black applicants are more "pressured" into accepting any positions offered regardless of the desirability of such positions, whereas Whites may not be subject to such pressures. Obviously, the data from our study does not provide an answer to this question and further research in this area is strongly indicated.

### (b) White vs Puerto Rican Employees

Tables 15a-i present a comparison of Puerto Rican and White employees' job search behavior in terms of the same categories that we've been considering. As may be quickly seen from an inspection of Table 16, which summarizes these comparisons, Puerto Rican workers, like Negro workers, report a greater usage of almost every method of job search behavior than do White workers. Four of the

## TABLE 15

## COMPARISON OF PUERTO RICAN AND WHITE EMPLOYEES' JOB SEARCH BEHAVIOR

a. "Going Cold to a Company" (Employee Q. 110)

Percentage Responses and Chi-Square Values*

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | Yes, and Landed Job | Yes, But Didn't Land Job | No | No Response |
| Puerto Rican (N=43) | 41.9 | 25.6 | 32.6 | 0.0 |
| White (N=97) | 46.4 | 10.3 | 43.3 | 0.0 |

$X^2$=1.429; df=1; (Not Significant)

b. "Asking Friends or Relatives" (Employee Q.111)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | Yes, and Landed Job | Yes, But Didn't Land Job | No | No Response |
| Puerto Rican (N=43) | 51.2 | 23.3 | 25.6 | 0.0 |
| White (N=97) | 43.3 | 17.5 | 39.2 | 0.0 |

$X^2$=2.352; df=1: (Not Significant)

*Chi-Square values were computed to test the significance of differences between total frequencies of "Yes"categories and the "No" category.

TABLE 15 --Continued

c. "Asking Around" (Employee Q. 112)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | Yes, and Landed Job | Yes, But Didn't Land Job | No | No Response |
| Puerto Rican (N=43) | 20.9 | 41.9 | 37.2 | 0.0 |
| White (N=97) | 16.5 | 18.6 | 64.9 | 0.0 |

$X^2$=9.312; df=1; p≤.01

d. "Registering at Unemployment Office" (Employee Q. 113)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | Yes, and Landed Job | Yes, But Didn't Land Job | No | No Response |
| Puerto Rican (N=43) | 37.2 | 32.6 | 27.9 | 2.3 |
| White (N=97) | 21.6 | 20.6 | 57.7 | 0.0 |

$X^2$=9.979; df=1; p≤.001

TABLE 15 -Continued

e. "Going to Private Employment Agency" (Employee Q. 114)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | Yes, and Landed Job | Yes, But Didn't Land Job | No | No Response |
| Puerto Rican (N=43) | 20.9 | 9.3 | 67.4 | 2.3 |
| White (N=97) | 10.3 | 6.2 | 83.5 | 0.0 |

$X^2$=3.714; df=1; (Not Significant)

f. "Asking at Community Agency" (Employee Q. 115)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | Yes, and Landed Job | Yes, But Didn't Land Job | No | No Response |
| Puerto Rican (N=43) | 9.3 | 9.3 | 81.4 | 0.0 |
| White (N=97) | 6.2 | 3.1 | 90.7 | 0.0 |

$X^2$=2.430; df=1; (Not Significant)

TABLE 15 -Continued

g. "Asking Local Politicians" (Employee Q. 116)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | Yes, and Landed Job | Yes, But Didn't Land Job | No | No Response |
| Puerto Rican (N=43) | 0.0 | 4.7 | 95.3 | 0.0 |
| White (N=97) | 4.1 | 1.0 | 94.8 | 0.0 |

$X^2$=.013; df=1; (Not Significant)

h. "Going to a Union" (Employee Q. 117)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | Yes, and Landed Job | Yes, But Didn't Land Job | No | No Response |
| Puerto Rican (N=43) | 11.6 | 11.6 | 76.7 | 0.0 |
| White (N=97) | 3.1 | 3.1 | 92.8 | 1.0 |

$X^2$=8.326; df=1; $p \leq .01$

TABLE 15- Continued

i. "Reading Want Ads" (Employee Q. 118)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | Yes, and Landed Job | Yes, But Didn't Land Job | No | No Response |
| Puerto Rican (N=43) | 44.2 | 34.9 | 20.9 | 0.0 |
| White (N=97) | 28.9 | 30.9 | 40.2 | 0.0 |

$X^2=4.923$; df=1; $p \leq .05$

nine comparisons are statistically significant.

It may be assumed that some of the reasons behind this more extensive use of most methods of job search behavior on the part of Puerto Rican workers are similar to those which we discussed in attempting to explain the differences between Negro and White workers. However, in both cases additional research is needed to more fully explain the findings. Also, it should be borne in mind that although both Blacks and Puerto Ricans have similar problems in finding employment in a White dominated society, there may be important differences

## TABLE 16

## SUMMARY COMPARISON OF PUERTO RICAN AND WHITE EMPLOYEES' JOB SEARCH BEHAVIOR IN TERMS OF TOTAL "YES" RESPONSES

| | Puerto Rican | White | Level of Significance |
|---|---|---|---|
| "Going Cold to a Company" | 68% | 57% | N.S. |
| "Asking Friends or Relatives | 74% | 61% | N.S. |
| "Asking Around" | 63% | 35% | $p \leq .01$ |
| "Registering at the Unemployment Office" | 70% | 42% | $p \leq .001$ |
| "Going to a Private Employment Agency" | 30% | 16% | N.S. |
| "Asking at a Community Agency" | 19% | 9% | N.S. |
| "Asking Local Politicians" | 5% | 5% | N.S. |
| "Going to a Union" | 23% | 6% | $p \leq .01$ |
| "Reading Want Ads" | 79% | 60% | $p \leq .05$ |

between these two minority groups.

(c) Negro vs Puerto Rican Employees

As might be expected from the findings presented in the previous two sections to the effect that in the case of both Black and Puerto Rican workers a higher percentage of the respondents reported using most means of job search behavior to a greater extent than did White workers, differences between Black and Puerto Rican workers are not very significant. Tables 17a-i present a comparison of Negro and Puerto Rican employees' job search behavior. As Table 18, presenting a summary of these comparisons, shows, there is a trend in the direction of greater reported usage of most means of job search behavior by Puerto Rican respondents. However, this trend achieves a moderate level of statistical significance in only two cases.

## TABLE 17

## COMPARISON OF NEGRO AND PUERTO RICAN EMPLOYEES' JOB SEARCH BEHAVIOR

a. "Going Cold to a Company" (Employee Q. 110)

Percentage Responses and Chi-Square Values*

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Negro (N=201) | 0.0 | 35.3 | 16.4 | 48.3 |
| Puerto Rican (N=43) | 0.0 | 41.9 | 25.6 | 32.6 |

$X^2$=3.468; df=1;(Not Significant)

b. "Asking Friends or Relatives" (Employee Q. 111)

Percentage Responses and Chi- Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Negro (N=201) | 1.5 | 48.3 | 24.4 | 25.9 |
| Puerto Rican (N=43) | 0.0 | 51.2 | 23.3 | 25.6 |

$X^2$=0.012; df=1;(Not Significant)

---

* Chi-Square values were computed to test the significance of differences between total frequencies of "Yes" categories and the "No" category.

TABLE 17 -Continued

c. "Asking Around" (Employee Q. 112)

Percentage Responses and Chi-Square Values

| Subjects | Response Caterories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Negro (N=201) | 1.5 | 20.9 | 22.9 | 54.7 |
| Puerto Rican (N=43) | 0.0 | 20.9 | 41.8 | 37.2 |

$X^2$=4.642; df=1; p=.05

d. "Registering at Unemployment Office" (Employee Q. 113)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Negro (N=201) | 1.0 | 41.8 | 20.9 | 36.3 |
| Puerto Rican (N=43) | 2.3 | 37.2 | 32.6 | 27.9 |

$X^2$=1.009; df=1; (Not Significant)

TABLE 17- Continued

e. "Going to Private Agency" (Employee Q. 114)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Negro (N=201) | 1.0 | 29.4 | 11.4 | 58.2 |
| Puerto Rican (N=43) | 2.3 | 20.9 | 9.3 | 67.4 |

$X^2$=1.553; df=1; (Not Significant)

f. "Asking at Community Agency" (Employee Q. 115)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Negro (N=201) | 1.0 | 7.0 | 1.5 | 90.5 |
| Puerto Rican (N=43) | 0.0 | 9.3 | 9.3 | 81.4 |

$X^2$=3.885; df=1; $p \leq .05$

TABLE 17 -Continued

g. "Asking Local Politicians" (Employee Q. 116)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Negro (N=201) | 1.5 | 3.5 | 3.0 | 92.3 |
| Puerto Rican (N=43) | 0.0 | 0.0 | 4.7 | 95.3 |

$X^2$=0.217; df=1; (Not Significant)

h. "Going to a Union" (Employee Q. 117)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Negro (N=201) | 2.5 | 4.0 | 9.0 | 84.6 |
| Puerto Rican (N=43) | 0.0 | 11.6 | 11.6 | 76.7 |

$X^2$=3.483; df=1; (Not Significant)

TABLE 17 -Continued

i. "Reading Want Ads" (Employee Q.118)

Percentage Responses and Chi-Square Values

| Subjects | Response Categories | | | |
|---|---|---|---|---|
| | No Response | Yes, and Landed Job | Yes, But Didn't Land Job | No |
| Negro (N=201) | 1.0 | 24.4 | 42.8 | 31.8 |
| Puerto Rican (N=43) | 0.0 | 44.2 | 34.9 | 20.9 |

$X^2$ =2.064; df=1; (Not Significant)

### iii. Differences Among Employees Based on Age, Sex Differences and Length of Residence in New York City

Tables 19, 20 and 21 present summary comparisons of employees' job search behavior based on other demographic characteristics, namely age, sex and length of residence in New York City. (The complete tables for these comparisons can be found in Volume II: Technical Appendix A, Tables A-2, A-3 and A-1 respectively.)

## TABLE 18

## SUMMARY COMPARISON OF NEGRO AND PUERTO RICAN EMPLOYEES' JOB SEARCH BEHAVIOR IN TERMS OF TOTAL "YES" RESPONSES

| | Negro | Puerto Rican | Level Significance |
|---|---|---|---|
| "Going Cold to a Company" | 52% | 68% | N.S. |
| "Asking Friends or Relatives" | 73% | 74% | N.S. |
| "Asking Around" | 44% | 63% | $p \leq .05$ |
| "Registering at the Unemployment Office" | 63% | 70% | N.S. |
| "Going to a Private Employment Agency" | 41% | 30% | N.S. |
| "Asking at a Community | 8% | 19% | $p \leq .05$ |
| "Asking Local Politicians" | 6% | 5% | N.S. |
| "Going to a Union" | 13% | 23% | N.S. |
| "Reading Want Ads" | 67% | 79% | N.S. |

Not suprisingly, a higher percentage of employees over 25 years of age report having used most means of job search behavior than those under 25 (see Table 19). The differences appear particularly significant with respect to formal means such as "Registering at the unemployment office" and "Reading want ads."

## TABLE 19

## SUMMARY COMPARISON OF JOB SEARCH BEHAVIOR OF EMPLOYEES 25 AND UNDER AND EMPLOYEES OVER 25 IN TERMS OF TOTAL "YES" RESPONSES

| | 25 & Under | Over 25 | Level of Significance |
|---|---|---|---|
| "Going Cold to a Company | 38% | 55% | $p \leq .05$ |
| "Asking Friends or Relatives" | 61% | 68% | N.S. |
| "Asking Around" | 32% | 44% | $p \leq .001$ |
| "Registering at the Unemployment Office" | 40% | 60% | $p \leq .001$ |
| "Going to a Private Employment Agency" | 23% | 33% | N.S. |
| "Asking at a Community Agency" | 14% | 9% | N.S. |
| "Asking Local Politicians" | 2% | 6% | N.S. |
| "Going to a Union" | 7% | 13% | N.S. |
| "Reading Want Ads" | 56% | 65% | $p \leq .001$ |

Also, as one might expect, males report using all means to a greater extent than do females (see Table 20). Most of these differences are statistically significant. This

## TABLE 20

## SUMMARY COMPARISON OF MALE AND FEMALE EMPLOYEES' JOB SEARCH BEHAVIOR IN TERMS OF TOTAL "YES" RESPONSES

| | Male | Female | Level of Significance |
|---|---|---|---|
| "Going Cold to a Company" | 65% | 47% | $p \leq .001$ |
| "Asking Friends or Relatives" | 77% | 63% | $p \leq .001$ |
| "Asking Around" | 54% | 35% | $p \leq .001$ |
| "Registering at the Unemployment Office" | 64% | 52% | $p \leq .01$ |
| "Going to a Private Employment Agency" | 36% | 30% | N.S. |
| "Asking at a Community Agency" | 11% | 9% | N.S. |
| "Asking Local Politicians" | 9% | 3% | $p \leq .01$ |
| "Going to a Union" | 14% | 11% | N.S. |
| "Reading Want Ads" | 75% | 60% | $p \leq .01$ |

is consistent with the generally greater labor force participation on the part of male workers.

In comparing subjects who have lived in New York City more than 5 years with those who have lived there less

## TABLE 21

## SUMMARY COMPARISON OF JOB SEARCH BEHAVIOR OF EMPLOYEES WHO HAVE LIVED IN N.Y.C. OVER 5 YEARS WITH EMPLOYEES WHO HAVE LIVED IN N.Y.C. 5 YEARS AND UNDER OR ARE NON RESIDENTS IN TERMS OF TOTAL "YES" RESPONSES

| | Over 5 Years | 5 Years Under or Non-Resident | Level of Significance |
|---|---|---|---|
| "Going Cold to a Company" | 52% | 54% | N.S. |
| "Asking Friends or Relatives" | 72% | 64% | N.S. |
| "Asking Around" | 50% | 40% | N.S. |
| "Registering at the Unemployment Office" | 64% | 44% | $p \leq .001$ |
| "Going to a Private Employment Agency" | 33% | 30% | N.S. |
| "Asking at a Community Agency" | 11% | 6% | N.S. |
| "Asking Local Politicians" | 5% | 6% | N.S. |
| "Going to a Union" | 15% | 6% | $p \leq .001$ |
| "Reading Want Ads" | 70% | 60% | $p \leq .02$ |

or are non-residents (see Table 21), it is interesting to note that significant differences occur in formal means of job search behavior , i.e. "Registering st the unemployment office," "Going to a union" and "Reading want ads." This is most likely due to the greater familiarity on the part of the longer-term residents with the employment resources of the City.

In light of the high rate of migration of low-skill workers into New York City, this finding may have certain policy implications; it would obviously be useful to provide further mechanisms (or improve existing mechanisms) designed to familiarize such workers with formal channels of employment opportunity.

### c. Occupational Mobility

#### i. Frequency of Job Changes

As we have mentioned earlier (p.85f), our data show no indication that Black workers change jobs more frequently than do White workers, i.e. that they constitute in any way an "unstable" labor force. Furthermore, our data show that Puerto Rican workers likewise show no significantly greater frequency of job changes than those classified as White. Tables 22 and 23 show comparisons of White and Negro workers and White and Puerto Rican workers, respectively, in terms of the mean frequency of job changes within the past year. A comparison of the means in both cases, by use of the t-test, shows that there are no significant differences. Tables 24 and 25 present the same comparisons in terms of the mean number of job changes within the past 5 years, and again the t-test shows no significant differences. Tables 26 and 27 present this same information for the last 10 years, and again no significant differences are found.

### ii. Vertical Mobility

The question of occupational mobility is of interest to us not only in terms of frequency of job changes, since such changes may represent either lateral or vertical mobility, but we are particularly interested in examining the question of possible differences in vertical mobility among different racial and ethnic groups.

Table 28 shows a comparison of White and Negro workers' occupational mobility from previous job held to present

## TABLE 22

### COMPARISON OF WHITE AND NEGRO WORKERS' FREQUENCY OF JOB CHANGES WITHIN THE PAST YEAR

| White (N=104) | | Negro (N=171) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\bar{X}$ | S.D. | $\bar{X}$ | S.D. | | | |
| 1.17 | 0.45 | 1.22 | 0.46 | -.05 | 220 | -.87 |

## TABLE 23

### COMPARISON OF WHITE AND PUERTO RICAN WORKERS' FREQUENCY OF JOB CHANGES WITHIN THE PAST YEAR

| White (N=104) | | Puerto Rican (N=38) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\bar{X}$ | S.D. | $\bar{X}$ | S.D. | | | |
| 1.17 | 0.45 | 1.13 | 0.34 | 0.04 | 86 | 0.58 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\bar{X}$ = Arithmetic Mean
S.D. = Standard Deviation

## TABLE 24

## COMPARISON OF WHITE AND NEGRO WORKERS' FREQUENCY OF JOB CHANGES WITHIN THE PAST FIVE YEARS

| White (N=65) | | Negro (N=111) | | Mean Diff. | df | t-value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D | | | |
| 1.54 | 0.79 | 1.69 | 0.87 | -.16 | 145 | -1.21 |

## TABLE 25

## COMPARISON OF WHITE AND PUERTO RICAN WORKERS' FREQUENCY OF JOB CHANGES WITHIN THE PAST FIVE YEARS

| White (N=65) | | Puerto Rican (N=25) | | Mean Diff. | df | t-value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D | $\overline{X}$ | S.D. | | | |
| 1.54 | 0.79 | 1.48 | 0.96 | 0.06 | 37 | 0.27 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\overline{X}$ = Arithmetic Mean
S.D.= Standard Deviation

## TABLE 26

## COMPARISON OF WHITE AND NEGRO WORKERS' FREQUENCY OF JOB CHANGES WITHIN THE PAST TEN YEARS

| White (N=48) | | Negro (N=75) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\bar{X}$ | S.D. | $\bar{X}$ | S.D. | | | |
| 2.02 | 1.21 | 2.08 | 1.10 | -.06 | 93 | -.27 |

## TABLE 27

## COMPARISON OF WHITE AND PUERTO RICAN WORKERS' FREQUENCY OF JOB CHANGES WITHIN THE PAST TEN YEARS

| White (N=48) | | Puerto Rican (N=20) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\bar{X}$ | S.D. | $\bar{X}$ | S.D. | | | |
| 2.02 | 1.21 | 3.05 | 4.14 | -1.03 | 20 | -1.09 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\bar{X}$ = Arithmetic Mean
S.D.= Standard Deviation

## TABLE 28

## COMPARISON OF WHITE AND NEGRO WORKERS' OCCUPATIONAL MOBILITY FROM PREVIOUS JOB HELD TO PRESENT JOB

(Negative Score: Upward Mobility)

| White (N=87) | | Negro (N=145) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\bar{X}$ | S.D. | $\bar{X}$ | S.D. | | | |
| -2.06 | 5.25 | -.07 | 1.86 | -1.99 | 99 | -3.41*** |

## TABLE 29

## COMPARISON OF WHITE AND PUERTO RICAN WORKERS' OCCUPATIONAL MOBILITY FROM PREVIOUS JOB HELD TO PRESENT JOB

(Negative Score: Upward Mobility)

| White (N=87) | | Puerto Rican (N=35) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\bar{X}$ | S.D. | $\bar{X}$ | S.D. | | | |
| -2.06 | 5.25 | -2.71 | 6.43 | 0.66 | 53 | 0.54 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\bar{X}$ = Arithmetic Mean
S.D.= Standard Deviation

one in terms of mean differences on a modified 2-digit version of the DOT code,[9] developed by Dr. Eleanor Gilpatrick[10] especially for our study. This 2-digit code has a range from 01 to 35, with the higher figure representing the least skilled occupational levels. Thus, a negative mean difference indicates upward mobility. As an inspection of Table 28 shows, the White workers in our sample showed a mean increase in upward mobility of 2.06 points on the 35 point scale while the Negro workers manifiested a negligible change of .07 points on this same scale. A t-test showed that this mean difference was highly significant ($t=3.41$; $p \leq .001$). Thus, Whites showed significantly greater upward mobility than their Negro counterparts.

A comparison of White and Puerto Rican workers (Table 29) revealed that both groups showed upward mobility, with no significant difference between the two groups.

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[9] op. cit.

[10] A more recently improved version of this code may be seen in E. Gilpatrick, "A Proposed System of Occupational Coding," Monthly Labor Review, October 1968, 91, No.10, 47-53.

Table 30 shows that even when we compare the mean occupational mobility from the previous three jobs held to the present one, Negro workers still show an insignificant mean increase of .72 compared with the White workers' mean increase of 2.52 scale points; the difference here is likewise statistically significant ($t=3.17$; $p \leq .01$), with Whites showing significantly greater upward mobility than Blacks.

In inspecting Table 31, the preceding finding that Whites and Puerto Ricans did not significantly differ is changed when considering the mean occupational mobility from previous three jobs held to present one; in this case, the Whites' mean increase of 2.52 scale points compares with the Puerto Ricans' mean increase of .34 scale points, yielding a statistically highly significant difference ($t=4.08$; $p \leq .001$).

Thus, whereas Negroes have failed to achieve significant upward occupational mobility relative to Whites, both with respect to their change from last job to present job as well as with respect to their changes over the last three

## TABLE 30

### COMPARISON OF WHITE AND NEGRO WORKERS' AVERAGE OCCUPATIONAL MOBILITY FROM PREVIOUS THREE JOBS HELD TO PRESENT ONE
(Negative Score: Upward Mobility)

| White (N=86) | | Negro (N=148) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| -2.52 | 4.68 | -.72 | 3.15 | -1.80 | 130 | -3.17** |

## TABLE 31

### COMPARISON OF WHITE AND PUERTO RICAN WORKERS' AVERAGE OCCUPATIONAL MOBILITY FROM PREVIOUS THREE JOBS HELD TO PRESENT ONE
(Negative Score: Upward Mobility)

| White (N=86) | | Puerto Rican (N=35) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| -2.52 | 4.68 | -.34 | 1.03 | -2.18 | 103 | -4.08*** |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\overline{X}$ = Arithmetic Mean
S.D.= Standard Deviation

jobs, the Puerto Rican subjects in our sample have shown approximately the same degree of upward mobility as Whites in the move from their previous job to present job but have apparently experienced downward mobility in some of their previous job changes (possibly those experienced after their migration from Puerto Rico) for an overall mean change of close to zero and, in any case, significantly lower than that for Whites.

In summary, the data show that although minority group workers do not show a significantly greater frequency of job changes (even when considering a time period as great as the last ten years), they have failed to benefit from the upward job mobility customary in the world of work and experienced by the White workers in our sample. This confirms the initial major assumption underlying the entire operation of SAI's efforts, namely that many low-skill, low-wage workers, especially Negroes and Puerto Ricans "... were becoming trapped in their jobs at the lowest occupational levels of industry."[11]

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[11] p.2, this Volume.

## 2. Perceptions of Employees and Supervisors

As we indicated earlier, the main focus of our study has been on the low-wage, low-skill employee. However, we have also collected data on their first-line supervisors and are interested in certain comparisons between these two groups. Some of these comparisons have already been presented, particularly in terms of some background variables and, in the preceding section, in terms of job search behavior.

However, of possibly even greater significance are comparisons in perceptions between employees and their first-line supervisors with respect to the central issue of our entire training effort, namely the employees' "readiness" for training for higher level jobs. It is difficult to measure what constitutes such "readiness" and even more difficult to make direct comparisons between employees' responses to questions concerning their readiness for upgrading and supervisors' perceptions of what the workers' responses would be. For example, in the initial versions of the Employees' and Supervisors' Interview Schedules, similar questions were asked with regard to the employees' "readiness" for training, but the data were not obtained in such a way as to make direct comparisons possible. In the Modified Versions of these interview schedules, which form a crucial part of the data base for the present study, such comparisons are possible.

Table 32 presents a direct comparison between workers' mean response to the question "How interested would you be in getting a better job at more pay?" with the mean response of the supervisors' perceptions of what the workers' responses to this question would be. In both cases the question was answered on a five-point scale with the higher number representing the least interest. As can be seen by an inspection of this table, the workers' mean response to this question was significantly closer to the "Very interested" end of the scale than was the supervisors' mean perception of what the response would be ($t=3.76$; $p \leq .001$).

Table 33 presents a similar comparison when the question asked is linked to working longer hours. Although, once again, the workers' mean response was closer to the "Very interested" end of the scale than was the supervisors' mean

## TABLE 32

### COMPARISON OF SUPERVISORS' PERCEPTIONS AND WORKERS' RESPONSES TO INTEREST IN BETTER JOB: (EMPLOYEE Q. 131; SUPERVISOR Q. 95)

"INTERESTED IN BETTER JOB AT MORE PAY"
(Very Interested = 1; Not Interested = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 2.15 | 1.20 | 1.32 | 0.85 | 0.84 | 63 | 3.76*** |

## TABLE 33

### COMPARISON OF SUPERVISORS' PERCEPTIONS AND WORKERS' RESPONSES TO INTEREST IN BETTER JOB: (EMPLOYEE Q. 131a; SUPERVISOR Q. 96)

"INTERESTED IF HAD TO WORK LONGER HOURS"
(Very Interested = 1; Not Interested = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 3.44 | 1.25 | 3.25 | 1.65 | 0.19 | 93 | 0.64 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\overline{X}$ = Arithmetic Mean
S.D. = Standard Deviation

perception of the responses, this difference is not significant; both groups' responses are less close to the "Very interested" end of the scale than when the question is asked without conditions.

The results in Table 34 are particularly interesting in light of the often heard complaint among management that it is difficult to get people to take on greater responsibility; these complaints are frequently made with low-wage, low-skill workers and members of minority groups in mind. Our results show that, even when the question of being interested in a better job is linked to "taking on more responsibilities," the workers' mean response is very close to the "Very interested" end of the scale and differs quite significantly from the perceptions that supervisors have of their responses ($t=3.98$; $p \leq .001$).

The results in Table 35 show perhaps the importance of the exact wording of such questions. When the question of "being interested in a better job" is linked to the phrase "even if you had to boss somebody else," the workers' responses are not quite as close to the "Very interested"

## TABLE 34

## COMPARISON OF SUPERVISORS' PERCEPTIONS AND WORKERS' RESPONSES TO INTEREST IN BETTER JOB:
(EMPLOYEE Q. 131b; SUPERVISOR Q. 97)

"INTERESTED IF HAD TO TAKE ON MORE RESPONSIBILITIES"
(Very Interested = 1; Not Interested = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 2.77 | 1.16 | 1.79 | 1.22 | 0.98 | 85 | 3.98*** |

## TABLE 35

## COMPARISON OF SUPERVISORS' PERCEPTIONS AND WORKERS' RESPONSES TO INTEREST IN BETTER JOB:
(EMPLOYEE Q. 131c; SUPERVISOR Q. 98)

"INTERESTED IF HAD TO BOSS SOMEBODY ELSE"
(Very Interested = 1; Not Interested = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 2.36 | 1.18 | 2.14 | 1.43 | 0.22 | 91 | 0.82 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\overline{X}$ = Arithmetic Mean
S.D.= Standard Deviation

end of the scale; they are slightly, though not significantly, closer to this end of the scale than are the supervisors' perceptions of their responses, however.

If it has been argued that people tend to stay with their present job because of the social gratification of interacting with the people with whom they work, our data do not show very strong support for such an assumption. When asked if they would be interested in a better job even if they had to leave the people they were working with, the workers in our sample still tended to give a mean response which was on the "Very interested" side of the scale. As Table 36 shows, their interest in a better job under this condition is significantly greater than their supervisors perceive it to be ($t=2.43$; $p \leq .05$). On the other hand, if the condition of losing their seniority is attached to getting a better job, the workers' mean response on the 5-point interest scale tends very much toward the neutral point and does not differ significantly from the supervisors' perceptions of their responses (Table 37).

In addition to the series of questions about interest in a

## TABLE 36

### COMPARISON OF SUPERVISORS' PERCEPTIONS AND WORKERS' RESPONSES TO INTEREST IN BETTER JOB: (EMPLOYEE Q. 131e; SUPERVISOR Q. 98a)

"INTERESTED IF HAD TO LEAVE PEOPLE YOU WORK WITH"
(Very Interested = 1; Not Interested = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$. | S.D. | | | |
| 2.69 | 0.98 | 2.11 | 1.38 | 0.59 | 94 | 2.43* |

## TABLE 37

### COMPARISON OF SUPERVISORS' PERCEPTIONS AND WORKERS' RESPONSES TO INTEREST IN BETTER JOB: (EMPLOYEE Q. 131f; SUPERVISOR Q. 98b)

"INTERESTED IF YOU WOULD LOSE SENIORITY"
(Very Interested = 1; Not Interested = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 3.21 | 1.17 | 2.95 | 1.61 | 0.26 | 94 | 0.91 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\overline{X}$ = Arithmetic Mean
S.D.= Standard Deviation

better job with more pay, the subjects were asked in the pre-test about their interest in taking part in a hypothetical training program. The response categories were again on a 5-point scale ranging from "Very interested" (=1) to "Not interested" (=5). Table 38 presents a comparison of the workers' mean response to the question of general interest in such a training program with the mean response of their supervisors' perception of their interest. As may be clearly seen from this table, both employees and supervisors give mean responses toward the "Very interested" end of the scale; however, the supervisors' perceptions differ significantly from the employees' responses with the employees' mean response significantly closer to the "Very interested" end of the scale.

When interest in a training program is made contingent upon "staying after regular work hours without pay," the employees' mean response tends, understandably, to fall somewhat more toward the neutral category (See Table 39). This is consistent with the findings reported earlier in Table 33. It is interesting to note, however, that the

### TABLE 38

### COMPARISON OF SUPERVISORS' PERCEPTIONS AND WORKERS' RESPONSES TO INTEREST IN TRAINING PROGRAM: (EMPLOYEE Q. 132; SUPERVISOR Q. 100)

GENERAL INTEREST
(Very Interested = 1; Not Interested = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 1.67 | 0.81 | 1.19 | 0.77 | 0.47 | 79 | 2.89 ** |

### TABLE 39

### COMPARISON OF SUPERVISORS' PERCEPTIONS AND WORKERS' RESPONSES TO INTEREST IN TRAINING PROGRAM: (EMPLOYEE Q. 132b; SUPERVISOR Q. 101)

"INTERESTED IF MEANT STAY AFTER REGULAR WORK HOURS WITHOUT PAY"
(Very Interested = 1; Not Interested = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 3.00 | 1.08 | 2.77 | 1.27 | 0.23 | 90 | 0.95 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\bar{X}$ = Arithmetic Mean
S.D.= Standard Deviation

employees in our sample continue to express a strong interest in training programs (i.e. their mean responses are toward the "Very interested" end of the scale), even when the pre-condition of having to "do some studying at home" is added, as may be seen from the results presented in Table 40. It is also interesting to note that, in this case too, the supervisors underestimate the degree of interest manifested by the employees, as indicated by the significant mean difference between the mean responses of the two groups.

Finally, when interest in training is associated with "becoming part of management," the employees' mean response is still very much on the "interested" side of the continuum (Table 41). Here there are no significant differences between supervisors' perceptions and workers' responses.

In addition to the sets of comparisons between workers' responses and supervisors' perceptions of these responses relating to workers' readiness for upgrading and training, mentioned above, we have other questions which allow a direct comparison of the perceptions of employees and

### TABLE 40

### COMPARISON OF SUPERVISORS' PERCEPTIONS AND WORKERS' RESPONSES TO INTEREST IN TRAINING PROGRAM:
(EMPLOYEE Q. 132c; SUPERVISOR Q. 102)

"INTERESTED IF HAD TO DO SOME STUDYING AT HOME"
(Very Interested = 1; Not Interested = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 2.23 | 0.90 | 1.79 | 0.86 | 0.44 | 79 | 2.40* |

### TABLE 41

### COMPARISON OF SUPERVISORS' PERCEPTIONS AND WORKERS' RESPONSES TO INTEREST IN TRAINING PROGRAM:
(EMPLOYEE Q. 132d; SUPERVISOR Q. 105)

"INTERESTED IF TRAINING TO BE PART OF MANAGEMENT"
(Very Interested = 1; Not Interested = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 1.90 | 0.82 | 1.81 | 1.01 | -.09 | 91 | -.48 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\overline{X}$ = Arithmetic Mean
S.D.= Standard Deviation

supervisors.

Starting on page 04-3 of the Modified Version the Employee Interview Schedule (EMI, Vol.III, Part 1, Appendix B-1), the employees were asked "If you were to describe your supervisor, would you say:" ...there follows then a series of declarative statements about the supervisors to which the employees were asked to agree or disagree on a 5-point scale ranging from "Strongly agree" (=1) to "Strongly disagree" (=5). We will present just a few of these comparisons here to give a flavor of this data. Table 42 presents a mean comparison of perceptions of employees and supervisors in response to the statement "tries to get the most work out of his workers no matter what." It is interesting to note that not only do the employees give a mean response which is more on the "agree" end of the continuum ($\overline{X}$ =1.81), but that supervisors (Q.33, SMI, Volume III, Part 2, Appendix B-3, p.04-4), when asked to imagine how the workers of whom they are in charge would respond in general, give as a mean response a figure likewise on the "agree" end of the continuum ($\overline{X}$ = 1.87), which though slightly less toward the "agree" end of the scale, does not significantly differ from the workers' mean

## TABLE 42

### COMPARISON OF SUPERVISORS AND WORKERS IN PERCEPTION OF SUPERVISOR: (EMPLOYEE Q. 51; SUPERVISOR Q. 33)

"TRIES TO GET THE MOST WORK OUT OF HIS WORKERS NO MATTER WHAT"
(Strongly Agree = 1; Strongly Disagree = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 1.87 | 0.70 | 1.81 | 0.99 | -.06 | 94 | -.38 |

## TABLE 43

### COMPARISON OF SUPERVISORS AND WORKERS IN PERCEPTION OF SUPERVISOR: (EMPLOYEE Q. 52; SUPERVISOR Q. 34)

"WILL DO ANYTHING TO KEEP HIS RECORD GOOD"
(Strongly Agree = 1; Strongly Disagree = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 4.36 | 0.90 | 3.88 | 1.14 | -.48 | 92 | -2.31* |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\overline{X}$ = Arithmetic Mean
S.D.= Standard Deviation

response ($t = -.38$; N.S.). In other words, workers in their mean response tend to agree that supervisors "try to get the most work out of the workers no matter what"; the supervisors in turn give a mean response indicating that they rather agree that this is how the workers will see them.

Table 43 presents a similar comparison between supervisors and workers in terms of their mean perceptions of the supervisors on the basis of a question which is worded more strongly, and thus, may be slightly more subject to social desirability of response. The statement with which the subjects are asked to agree or disagree is whether the supervisor "Will do anything to keep his record good." Both groups give mean responses which are on the "disagree" side of the 5-point scale. However, whereas the workers' mean response is only slightly on the disagree side ($\overline{X} = 3.88$), the supervisors' perceptions of how the workers see them is somewhat more on the disagree side of the continuum ($\overline{X} = 4.36$). This difference is statistically significant ($t=2.31$; $p \leq .05$), with supervisors expecting their workers to disagree with this statement more strongly than they actually do. Table 44 presents a comparison on the basis of a question which may likewise be susceptible to "social desirability" of responses, i.e. the supervisor "treats everyone alike"; both groups give mean responses which are on the "agree" end of the scale and do not significantly differ from each other.

Table 45 presents a comparison which again may be too strong for some subjects to agree with, i.e. that the supervisor "treats his workers like children"; and thus, both groups give mean responses which are on the "disagree" side of the continuum and do not differ significantly from each other.

Unquestionably, there are many discrepancies between the perceptions of supervisors and workers in a variety of areas which have not shown up in present data. The question of "social desirability" of responses is an extremely important one as has been pointed out by Marlowe and Crowne (1959), among others, and highlights the necessity of careful pre-testing and developing of items capable of circumventing this confounding intervening variable and

## TABLE 44

## COMPARISON OF SUPERVISORS AND WORKERS IN PERCEPTION OF SUPERVISOR: (EMPLOYEE Q. 53; SUPERVISOR Q. 36)

"TREATS EVERYONE ALIKE"
(Strongly Agree = 1; Strongly Disagree = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 1.97 | 1.11 | 1.96 | 1.15 | -.01 | 84 | -.04 |

## TABLE 45

## COMPARISON OF SUPERVISORS AND WORKERS IN PERCEPTION OF SUPERVISOR: (EMPLOYEE Q. 54; SUPERVISOR Q. 37)

"TREATS HIS WORKERS LIKE CHILDREN"
(Strongly Agree = 1; Strongly Disagree = 5)

| Supervisor (N=39) | | Worker (N=57) | | Mean Diff. | df | t-Value |
|---|---|---|---|---|---|---|
| $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 4.21 | 0.95 | 4.14 | 1.13 | -.06 | 90 | -.30 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

$\overline{X}$ = Arithmetic Mean
S. D.= Standard Deviation

producing measures that adequately tap discrepancies in perceptions which may well exist in reality.

It is nevertheless interesting to see in our data significant differences which do exist between supervisors' and workers' perceptions, as exemplified in Table 43, with many supervisors failing to perceive just how negatively they are regarded by their workers. It is also interesting to note that in the case of other items, such as the one presented in Table 42 where, although there is no significant difference between the perceptions of the two groups, an inspection of the actual means shows that the workers perceive the supervisors in a rather negative fashion and the supervisors realize that they are in fact perceived in this negative way. Both types of problems and how they are to be dealt with are obviously important issues to be taken up in the training of supervisory personnel.

## 3. Preliminary Analyses of Attitudinal Variables

### a. Procedure

The Employee Interview Schedule contained questions which were designed to explore a number of different areas. In the preceding sections we have discussed background variables such as education, job search behavior and occupational mobility, as well as certain discrepancies in perceptions that exist between employees and supervisors. The interview schedules also contained a large number of questions designed to tap a variety of attitude areas, ranging from general attitudes and personality dispositions to specific attitudes concerning training and other job-related areas.

When dealing with large numbers of attitudinal items at least two considerations make it advisable to perform preliminary analyses aimed at reducing the mass of data. First, it is extremely difficult to thoroughly inspect all possible interrelationships of items with each other when the number of items becomes large. If, for example, we wished to study the interrelationships among 150 items by correlating every item with every other item, this would yield a matrix of 22,500 correlation coefficients. Thus, some form of preliminary analysis is desirable to reduce the data to manageable proportions.

A second consideration has to do with the unreliability of single scale items. Numerous authors in the area of psychometrics have demonstrated that single items have low internal consistency as well as very low test-retest reliability (e.g.Cronbach, 1951). This is true not only for I.Q. and other educational tests but is particularly so in the case of items measuring social attitudes, as Nunnaly (1959), among others, has pointed out. Davis (1966) has demonstrated that even highly structured attitude scale items which have been carefully pre-tested, such as those contained in Osgood's Semantic Differential (Osgood, Suci and Tannenbaum,1957), have very low test-retest reliability when used singly.

There are a number of statistical tools which may be used to deal with these problems. Factor analysis is one of the most useful and widely used tools of this sort. Factor analysis is a statistical technique which can be used for the preliminary analysis of data in such a way as to serve the twin aims of reducing the data to manageable proportions and obtaining composite scores which are significantly more reliable than single scale items. Factor analysis is essentially a procedure designed to summarize a correlation matrix by finding clusters of items that tend to "hang" together. The clusters or factors that result from this analysis represent dimensions which reflect the underlying psychological structure of the subjects' responses to the items. Of course, the factors or dimensions that result are limited by the responses which constitute the input data. The responses in turn are determined by the nature of the items being used, and by the nature of the subjects giving the responses, as well as by other variables. With these considerations in mind, we will examine the results obtained from the use of factor analysis, used here as an exploratory tool designed to reduce our rather extensive data to a manageable number of interpretable dimensions.

### b. Factor Analytic Results

#### i. General Attitudes

One set of 54 questions on the Employee Interview Schedule was designed to tap a variety of general attitudinal and personality variables. Although some of the items relate to the work situation, most of them are rather general in nature. (A second set of items, which we will discuss later, relates specifically to training and work attitudes). Many of these 54 items were constructed for this particular study. Others were selected from the results of a factor analytic study of a large number of attitudinal and personality items by Davis and Jacobs (1967).

The questions were in the form of statements with which the subjects were asked to agree or disagree in varying degrees. The responses to these questions formed an ordinal scale varying from 1 (Agree very much) to 4 (Disagree very much). The values obtained from the responses to these 54 items by 353 employees for whom we have complete data[12] were factor analyzed[13] and yielded the following 6 factors which seemed to be clearly interpretable:

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[12] There are several reasons for the discrepancy between this figure and the total number of pre-tested employees listed in Table 1. At Manufacturing Firm Z pilot interviews were conducted which did not contain the same or comparable questions; thus these 49 protocols, as well as those of a number of other subjects who had obviously incomplete data were not used in further analyses. For the remaining subjects the data generated by their responses were subjected to a missing data program. This program systematically analyzed the number of responses which were complete for a given subject and the number of subjects who had complete data for a given response. An arbitrary decision was made to delete those subjects who were missing 20% or more of the relevant responses. For the remaining subjects, who may have been missing only one or two items, these data were replaced by the empirical means of those subjects who had provided complete data. The group mean which was used as a basis for replacing the missing data was not the grand mean of all subjects who gave complete responses,but the mean of those subjects who were of the same sex and ethnic background.

[13] Since factor analysis is a generic term which embraces a variety of different techniques, a brief technical note might be in order. Principal Axis factors were extracted using the Principal Components technique. These factors were then orthogonally rotated to simple structure using Kaiser's (1958) Varimax Criterion. Several different factor solutions were tried,involving different numbers of Varimax rotated factors. The choice of a six factor solution made with this set of data was based on a combination of analytic criteria and the psychological interpretability of the resulting factors.

| | | |
|---|---|---|
| Factor | I | Feelings of Despair |
| Factor | II | Perceived Discrimination |
| Factor | III | Self Respect and Compassion for Others |
| Factor | IV | Distrust of Work Institutions |
| Factor | V | Affective Acceptance of Work Atmosphere |
| Factor | VI | Feelings of Hostility |

The interpretation of the factors was made possible by inspection of the highest loading items on each factor to determine what it is that they have in common. Of course the naming of the factor is a matter of judgment and may be open to different interpretation. The reader may wish to inspect the actual items on each factor in order to get a feeling for the descriptive labels which we have listed above. Table 46 presents the wording and reference numbers of selected items which have the highest loadings on each of these six Varimax rotated factors, together with the factor loading for each item and the percent variance accounted for by each factor. Table A-4 in Technical Appendix A presents the complete factor analytic results, listing each of the 54 items and its

## TABLE 46

## Factor Analysis of 54 Attitudinal and Personality Items Employees Phase I (N=353)

Selected Items from 6 Varimax Rotated Factors

| Item Number[1] | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | Factor I: Feelings of Despair | | | |
| 185 | How often do you feel that you have no one to turn to? | .73 | | |
| 186 | How often do you feel that you have problems with your life that are too much for you? | .56 | | |
| 187 | How often do you feel upset when people find fault with you? | .61 | | |
| 189 | How often do you feel that people laugh at you? | .63 | | |
| | | | 5.88 | 5.88 |

---

[1] This refers to the question number in the Modified Employee Pre-Test Interview Schedule, Appendix B-1.

TABLE 46 --continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | Factor II: Perceived Discrimination | | | |
| 139 | I believe that most people treat others more by what they think of their race or nationality than the sort of person they are. | .49 | | |
| 161 | The police are tougher on Negroes and Puerto Ricans than they are on most other people. | .59 | | |
| 163 | In this country most people don't want to see colored people move up to better jobs. | .58 | | |
| 164 | People who don't have much money can't expect to get justice in the courts. | .50 | | |
| 178 | Negroes and Puerto Ricans who do the same work as whites usually get paid less than whites. | .59 | 7.13 | 13.02 |

TABLE 46--continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | Factor III: Self-Respect and Compassion for Others | | | |
| 134 | I think that I am a person who cares about the feelings of other people. | .60 | | |
| 137 | I am able to do things as well as most other people. | .51 | | |
| 141 | There is much in my life that I am proud of. | .53 | | |
| 145 | It upsets me very much to see another person suffer. | .54 | | |
| | | | 4.28 | 17.30 |
| | Factor IV: Distrust of Work Institutions | | | |
| 158 | There is no use in training Negroes and Puerto Ricans for better jobs because most white employers wouldn't hire them anyway. | .42 | | |
| 162 | Unions don't help you; they just collect your dues. | .56 | | |
| 167 | Unions have helped better conditions for working people. | -.60 | | |
| 170 | Even if I could do more skilled work than I do now I would not get a chance to do it here. | .53 | | |
| | | | 5.90 | 23.20 |

TABLE 46--continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | **Factor V: Affective Acceptance of Work Atmosphere** | | | |
| 179 | This department is a pleasant place to work. | -.60 | | |
| 180 | This department does good work. | -.53 | | |
| 181 | This department is a friendly place to work. | -.60 | | |
| | | | 4.44 | 27.63 |
| | **Factor VI: Feelings of Hostility** | | | |
| 152 | At times I have a strong feeling to do something bad or shocking. | .60 | | |
| 155 | I have often either broken rules and regulations or really wanted to. | .54 | | |
| 157 | At times I feel like smashing things. | .60 | | |
| | | | 4.77 | 32.41 |

loadings on each of the six Varimax rotated factors.

When items have high loadings on the same factor this indicates that subjects who respond in a particular way to one of the items are likely to respond in the same way to the other high loading items on this factor. This may be illustrated by looking at a concrete example. Let us take Factor IV, Distrust of Work Institutions. It may be seen that item #158 ("There is no use in training Negroes and Puerto Ricans for better jobs because most White employers won't hire them anyway") and item #162 ("Unions don't help you, they just collect your dues") both have moderately high loadings on this factor. Similarly item #167 ("Unions have helped better conditions for working people") loads high on this factor, but with the opposite sign, since the meaning is in the opposite direction. Thus subjects who see employers in a negative light also tend to see unions in a negative light. This led us to a more generalized description of this factor as "Distrust of Work Institutions."

After obtaining these factor analytic results the next procedure was to combine each subject's responses to the highest loading items on each factor as indicated in Table 46 to form a composite score. It is assumed that all of the items making up this composite score are measuring the same general thing along a psychological dimension. In this manner the data represented by these 54 responses were reduced to six variables for each subject, corresponding to the six composite scores based on the factor analytic results. In addition to the advantage of data reduction, such composite scores have greater reliability as psychological measures, as we have mentioned previously.

### ii. Attitudes toward Training and Work

In addition to the above set of variables the questionnaire contained 96 questions which were responded to in a manner that would yield roughly ordinal data and thus be amenable to further statistical analyses. These questions related mostly to training and various aspects of the work situation. Extensive item analyses, including exploratory correlational and factor analyses, were conducted with these 96 items. A number of the items had to be rejected because they showed no variance, i.e. the overwhelming majority of the subjects responded in the same way to the question. Since such responses do not vary significantly, they also cannot show significant co-variation with other variables; this essentially precludes further statistical analysis.

As a result of the item analyses these 96 questions were reduced to 48 selected items which were then subjected to a final factor analysis. The following 7 clearly interpretable factors emerged from this analysis:

| | | |
|---|---|---|
| Factor | I | Expressed Readiness for Training |
| Factor | II | Disinclination to Leave Job |
| Factor | III | Positive Perception of Supervisor |
| Factor | IV | Wage Dissatisfaction |
| Factor | V | Dissatisfaction with Rule Changes |
| Factor | VI | Expressed Readiness for Upgrading to Supervisory Position |
| Factor | VII | Occupational Self-Confidence |

Table 47 presents the complete wording of selected items from 7 Varimax rotated factors, together with the actual factor loadings and the percent variance accounted for by each factor. Table A-5 in Technical Appendix A presents the complete results of this factor analysis, including the wording of all 48 variables and their loadings on each

TABLE 47

Factor Analysis of 48 Selected Variables
Employees Phase I (N=114)

Selected Items from 7 Varimax Rotated Factors

| Item Number[1] | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | Factor I: Expressed Readiness for Training | | | |
| 131 | Would you be interested in getting a better job at more pay here? 1=Very interested; 5=Not interested. | -.67 | | |
| 132 | Let's suppose a training program were given here so that workers doing your kind of work could learn to do another job that paid more money. How interested would you be in taking part in it? 1=Very int.; 5=Not int. | -.84 | | |
| 132a | Would you be interested if you were paid while you were being trained during your regular hours of work? 1=Very int.; 5= Not int. | -.82 | | |
| 132b | How interested would you be if it meant that you had to stay after regular work hours without pay? 1=Very int;5=Not int. | -.62 | | |

(continued)

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[1] This refers to the question number in the Modified Employee Pre-Test Interview Schedule, Appendix B-1.

TABLE 47--continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | Factor I: Expressed Readiness for Training --continued | | | |
| 132c | If the training program meant that you would have to do some studying at home, would you be willing? 1=Very int.; 5=Not int. | -.84 | | |
| 132d | If the training program meant that you would be trained for a job that would make you part of management, like a foreman or supervisor, would you be willing to take part in it? 1=Very int.; 5=Not int. | -.79 | 10.20 | 10.20 |
| | Factor II: Disinclination to Leave Job | | | |
| 122 | Suppose you got a job in some other company (hospital), would you feel sorry about leaving here? 1=Very sorry; 5=Very glad | -.74 | | |
| 123 | Would you miss your friends here? 1=A great deal; 5=Not at all. | -.71 | | |
| 124 | Would you miss the people you work with? 1=A great deal;5=Not at all | -.76 | | |
| 125 | Would you miss your foreman (title)? 1=A great deal; 5=Not at all. | -.75 | | |
| 127 | Would you miss doing the kind of work you do here? 1=A great deal; 5=Not at all. | -.75 | 9.00 | 19.20 |

TABLE 47 --continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | Factor III: Positive Perception of Supervisor | | | |
| 56 | Do you think that you could almost drop dead at work and the bosses wouldn't notice, or do you feel they are for you here as a person? 1= They really care for you; 3=Nobody notices you. | -.57 | | |
| 50 | He takes a personal interest in his workers' problems? 1=Strongly agree; 5=Strongly disagree | -.65 | | |
| 52 | He will do anything to keep his own record good with the company (hospital) no matter who gets hurt? 1=Strongly agree; 5=Strongly disagree | .53 | | |
| 53 | He treats everyone alike? 1=Strongly agree; 5=Strongly disagree | -.77 | | |
| 54 | He treats his workers like children? 1=Strongly agree; 5=Strongly disagree | .62 | 6.78 | 25.98 |

TABLE 47 --continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | Factor IV: Wage Dissatisfaction | | | |
| 29 | Do you feel that your rate of pay is too high, about right, or too low for the work you do? 1=Too high; 3=Too low | .46 | | |
| 30 | Do you think that for the kind of work you do, most other companies (hospitals) that you know about pay more than you get, pay less, or most pay about the same as you get? 1=Most others pay more; 3=Most others pay less | -.55 | | |
| 129 | Would you be willing to take a chance at a better job with more pay even if you weren't sure you could make good on it, or would you rather work at a job like you have which you are sure you can do? 1=A chance at a better paying job; 3=Job like present job | -.42 | | |
| $D_1$ | Discrepancy between present weekly wages and wages needed to just get along. 1=One-fifth or less; 5=Five-fifths or more | .60 | | |
| $D_2$ | Discrepancy between present weekly wages and wages needed to be comfortable. 1=One-fifth or less; 5=Five-fifths or more | .65 | | |
| | | | 5.26 | 31.24 |

TABLE 47 --continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | **Factor V: Dissatisfaction with Rule Changes** | | | |
| 57 | Rules are changed here without warning. 1=Disagree very much; 4=Agree very much | .67 | | |
| 58 | Rules are changed here regardless of their effect on the workers. 1=Disagree very much; 4=Agree very much | .58 | | |
| 108 | Supposing another company (hospital) offered you the same kind of job you have here, at the same pay. Would you be interested in taking it? 1=Definitely interested; 5=Definitely not interested | -.43 | | |
| | | | 4.88 | 36.12 |
| | **Factor VI: Expressed Readiness for Upgrading to Supervisory Position** | | | |
| 131b | Would you be interested if you had to take on more responsibilities? 1=Very interested; 5=Not interested | .44 | | |
| 131c | If you had to "boss" somebody else? 1=Very interested; 5=Not interested | .81 | | |
| 131d | If you had to "boss" people you work with? 1=Very interested; 5=Not interested | .81 | | |

TABLE 47 --continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | Factor VI: Expressed Readiness for Upgrading to Supervisory Position --continued | | | |
| 131e | If you had to leave the people you are working with? 1=Very interested; 5=Not interested | .59 | | |
| 131f | If you would lose your seniority? 1=Very interested; 5=Not interested | .55 | | |
| | | | 6.31 | 42.43 |
| | Factor VII: Occupational Self-Confidence | | | |
| 11 | Do you think that your job is too hard, too easy or just about right for you? 1=Too easy; 5=Too hard | .44 | | |
| 59 | Do you feel you could improve the way things are done around here? 1=Yes; 3=No | .60 | | |
| 106 | In general, what do you think are your chances of getting a better job here? 1=Very good; 4=Poor | .40 | | |
| 128 | Supposing you didn't have a job and somebody offered you a job that gave you $100 a week, and somebody else offered you a job for $75 a week now, with the chance of making $150 a week in the next few years, which would you take? 1=$100 per week; 3=$75 now with a chance of $150 later | -.55 | | |
| | | | 4.29 | 46.72 |

of these 7 Varimax rotated factors. Since these 48 variables were taken from different parts of the questionnaire and had different types of response categories, the nature of the response category is indicated together with the wording of the question. In a manner similar to that described above, composite scores were then obtained for each subject, based on his responses to the selected highest loading items on each of these 7 factors. In this manner this set of 48 questions was reduced to 7 variables.

### iii. Combined Analysis of Selected Items

As an exploratory procedure we combined the highest loading items from both sets of data described above and performed a factor analysis on this combined set totaling 68 selected items. The following 12 factors emerged from this analysis:

| | | |
|---|---|---|
| Factor | I | Job Dissatisfaction |
| Factor | II | Expressed Readiness for Upgrading |
| Factor | III | Pessimistic View of Civil Rights Progress |
| Factor | IV | Wage Dissatisfaction |

| | | |
|---|---|---|
| Factor | V | Dissatisfaction with Perceived Lack of Opportunity |
| Factor | VI | Feelings of Despair |
| Factor | VII | Distrust of Institutions |
| Factor | VIII | Frustration with Hostility |
| Factor | IX | Perceived Unfairness of Supervisor and Company |
| Factor | X | Resignation with Acceptance of Company |
| Factor | XI | Impatience with Civil Rights Progress |
| Factor | XII | Risk-Taking Proclivity |

Some of these factors are the same or very similar to the factors that emerged from the previous two analyses. On the other hand, some factors emerged which were different, representing perhaps somewhat different dimensions from those tapped in the previous two analyses. Since these 12 factors are in large part very similar to the ones reported above, we will not present detailed selected tables of these results at this point. The complete factor analytic results of these 68 variables are reported in Table A - 6, Technical Appendix A. In keeping with the exploratory nature of this study we will retain all three sets of factors in our discussion of further analyses. In spite of a certain amount of overlap, we have nevertheless condensed some 150 items into 25 composite scores based on these three factor analyses.

## 4. Relationships Among Variables

The term "descriptive analysis" can be taken to mean many different things depending on the nature of the data and the techniques which are used to describe the data. Earlier in the paper, we described certain background variables of the subjects, both employees and their first-line supervisors, and also made comparisons between the perceptions of employees and supervisors. The general technique used was to compare the mean responses of groups of subjects to individual questions.

In the immediately preceding section we have described how we have applied modern analytic techniques to reduce large quantities of attitudinal type data to more manageable proportions. We have used factor analysis both to reduce the data and to explore its underlying psychological dimensions.

At this point, we will present some of the significant relationships between certain biographical variables, on the one hand, and attitudinal variables on the other, whereby the attitudinal variables will be expressed in terms of the composite scores resulting from the interpretable factors discussed in the preceding section. We will also be interested in the interrelationships between the attitudinal variables themselves, particularly since they resulted from separate factor analyses of different sets of attitudinal items.

Statistically speaking, there are many different ways of expressing the relationship between variables.[14] In this case we will present the interrelationships between these variables in terms of a correlational analysis.

Table 48 presents the intercorrelations of six selected biographical variables and the composite scores on six attitudinal and personality factors resulting from a factor analysis of 54 items contained in the Employee Pre-Test Interview Schedule. These factors were presented in greater detail in Table 46. Table 48 presents the intercorrelation of every possible pair of these 12 variables. Variables 1-6 are biographical items and variables 7-12 represent the six composite scores on the attitude factors. The numbers 1-12 are arbitrarily assigned for purposes of this table; along the left hand column the variables are written out and correspond to the numbers 1-12 across the top row. The reader will note that the spaces represented by the intersection of each variable with itself, i.e. 1 with 1, 2 with 2, etc., is indicated by a dash, since it is known in advance that the correlation of any variable with itself is equal to 1.00. Similarly, only one-half of the correlation matrix is presented since the other half would simply be a mirror image.

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[14] The various types of variables and the statistical techniques which may be applied to analyze the relationships between the variables is discussed in some detail in a previous memorandum (Technical Memorandum RES: 119, December 4, 1967.)

The correlations of some of the biographical variables with each other are, in part, artifactual. For instance, the significant correlation of .40 between age (var.1) with

## TABLE 48

### INTERCORRELATIONS OF 6 SELECTED BIOGRPAHICAL VARIABLES AND COMPOSITE SCORES ON 6 ATTITUDINAL AND PERSONALITY FACTORS
All Employees (N=328)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age | - | 40** | 05 | 08 | -29** | -08 | -14* | -19** | 01 | -02 | 23** | -14* |
| 2. Mos. on Present Job | | - | 09 | 08 | -25** | -10 | 04 | 00 | 04 | 08 | 04 | -07 |
| 3. Minutes to Work | | | - | -01 | -16** | 17** | 06 | 10 | 04 | 04 | -10 | -01 |
| 4. Weekly Take-Home Pay | | | | - | 35** | 07 | -08 | 04 | 03 | 01 | 05 | -08 |
| 5. Yrs. Educ. Completed | | | | | - | -05 | -04 | -04 | -05 | -04 | -02 | 04 |
| 6. No. Dependents | | | | | | - | -01 | 15** | 07 | 06 | -11* | 05 |
| 7. Feelings of Despair | | | | | | | - | 10 | -18** | 19** | -30** | 37** |
| 8. Perceived Discrimination | | | | | | | | - | 06 | 41** | -17** | 13* |
| 9. Self-Respect and Compassion for Others | | | | | | | | | - | 00 | 11 | -16** |
| 10. Distrust of Work Institutions | | | | | | | | | | - | -15** | 19** |
| 11. Affective Acceptance of Work Atmos. | | | | | | | | | | | - | -28** |
| 12. Feelings of Hostility | | | | | | | | | | | | - |

*p ≤ .05; **p ≤ .01.

(Decimal points omitted)

number of months on the present job (var.2) is not particularly exciting since it is fairly obvious that workers who have been on their present job for a relatively long period of time would tend to be older workers.

In general, the reader is invited to inspect the relationships shown in Table 48 and in subsequent tables. We will not take the time here to comment on every relationship which reaches statistical significance. It should be noted, however, that the statistical significance associated with the correlation between two variables is primarily an indication that, within certain probability limits, such a relationship would show up at approximately the same magnitude given the theoretical possibility of obtaining data from an unlimited number of comparable subjects. It does not imply a causal relationship. In terms of the amount of variance which two variables have in common, this variance is not equal to the coefficient of correlation between the two variables (r), but rather is equal to $r^2$.

Of the biographical variables in Table 48, perhaps the most interesting one in terms of the intercorrelations with the other biographical variables, is variable 5, years of of education completed. Although not surprising, it is of interest to note that our data conform to overall trends in showing a negative correlation between this variable and variable 1, age ($r = -.29$). Also not surprising, but of practical significance in discussing continuing education with low-skill, low-wage workers, is the positive correlation between years of education completed and weekly take-home pay.

We shall now make a brief, but systematic, inspection of some of the other results of Table 48 by examining the interrelationships between composite scores on the factors with the biographical variables. Starting with the first attitudinal factor, "Feelings of Despair" (var.7), and proceeding vertically down that column, we see that this factor correlates with only one biographical variable, i.e. age, and then only at a moderate level of significance. The negative sign of the correlation coefficient means that younger workers tend to express relatively more "Feelings of Despair" and/or older workers tend to express fewer of such feelings. To appreciate more fully the meaning of any such relationships, the reader may wish to refer back to the appropriate table (in this case, Table 46) which gives in greater detail the items which went into a given factor. In a subsequent table we will comment on the relationships between age and other variables; for now, we will focus on relationships between the remaining attitudinal factors and biographical variables in Table 48.

Proceeding vertically down the next column, indicating the second attitudinal variable, "Perceived Discrimination" (var.8), we note again a negative correlation with age indicating that older respondents express less "Perceived Discrimination" and/or younger respondents express greater "Perceived Discrimination." The greater perception on the part of younger people of racial and ethnic discrimination reflects their greater awareness of realities which, although not new, have produced an increasingly strong reaction in recent years.

Variable 9 ("Self-Respect and Compassion for Others") did not show significant relationships with any of the biographical variables; we will discuss the interrelations among the attitudinal variables in connection with a subsequent table

(Table 50). In going back to our original data, and inspecting the means and standard deviations of each of the variables, we found that the items with high loadings on this factor had particularly high means and low standard deviations. Such variables will tend not to correlate significantly with other variables. It is quite possible that the items on this factor had primarily a social desirability of response in common and thus formed a factor which is an artifact. This illustrates why it is important to "keep in touch" with the raw data while taking advantage of patterns that emerge through the use of factor analysis as an exploratory tool; such patterns might not have otherwise emerged.

Variable 10 ("Distrust of Work Institutions") likewise did not show any significant correlation with any of the biographical variables and, again, we shall discuss significant relationships with attitudinal variables subsequently.

Variable 11 ("Affective Acceptance of Work Atmosphere") shows a significant positive correlation with age, indicating a greater acceptance of the work situation, particularly the department in which they work, on the part of relatively older workers. The term "acceptance" might also possibly be interepreted as "resignation." The fact that age also correlates with "Feelings of Despair" (negatively) and with "Perceived Discrimination" (negatively) completes a picture of older workers having accommodated to the "system" as it is. This does not, on the one hand, indicate that they are, in some sense of the word, "better" workers. On the other hand, they should not, in any way, be disfavored in selection for a training program. What our data do suggest is that the factor of age should be given consideration in dealing with trainees of differing ages.

Variable 12 ("Feelings of Hostility") correlates only with the variable of age; the correlation coefficient is only moderately significant and is negative, indicating that younger workers tend to express greater "Feelings of Hostility" than do older ones. This is in line with our other findings and is not unexpected.

Table 49 presents the intercorrelations of the same six selected biographical variables, contained in the preceding table, with composite scores on six out of the seven[15] work attitude factors described earlier in Table 47. Proceeding in similar fashion as before, we will inspect the results presented in Table 49 by beginning with the first work attitude factor, "Readiness for Training" (var. 7). As may be seen, this factor correlates negatively, to a significant extent, with age and, to a lesser extent, with months on present job. Consistent with the fact noted earlier that age and years of education completed correlate negatively with each other, this factor correlates positively with education. Thus, the employees who express a greater readiness for training tend to be younger, better educated and newer on the job.

Variable 8, "Positive Perception of Supervisor," also correlates negatively with age, although to a less significant extent. This variable does correlate very sig-

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[15] Composite scores for Factor II of this analysis ("Disinclination to Leave Job") were not available for all 328 subjects because responses to some of the items which made up this factor were missing for a number of the subjects.

## TABLE 49

### INTERCORRELATIONS OF 6 SELECTED BIOGRAPHICAL VARIABLES AND COMPOSITE SCORES ON 6 WORK ATTITUDE FACTORS
All Employees (N=328)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age | - | 40** | 05 | 08 | -29** | -08 | -20** | -12* | -08 | 09 | -08 | 11 |
| 2. Mos. on Present Job | | - | 09 | 08 | -25** | -10 | -15** | -07 | -05 | 08 | -10 | 07 |
| 3. Minutes to Work | | | - | -01 | -16** | 17** | -01 | -07 | 03 | 03 | -02 | 00 |
| 4. Weekly Take-Home Pay | | | | - | 35** | 07 | 01 | -01 | -02 | -01 | 09 | 05 |
| 5. Yrs. Educ. Completed | | | | | - | -05 | 20** | 24** | 10 | 04 | 18** | -09 |
| 6. No. Dependents | | | | | | - | -02 | -14* | 13* | -07 | 16** | 06 |
| 7. Readiness for Training | | | | | | | - | 33** | -02 | 00 | 46** | -21** |
| 8. Positive Perception of Supervisor | | | | | | | | - | -04 | -02 | 14* | -46** |
| 9. Wage Dissatisfaction | | | | | | | | | - | 03 | 15** | -03 |
| 10. Dissatisfaction with Rule Changes | | | | | | | | | | - | -03 | -08 |
| 11. Readiness for Upgrading to Sup. Position | | | | | | | | | | | - | -11* |
| 12. Occupational Self-Confidence | | | | | | | | | | | | - |

*p ≤ .05; **p ≤ .01.

(Decimal points omitted)

nificantly and in a positive direction with years of education completed. Thus, although our preceding findings showed younger workers to be higher on "Feelings of Despair," "Perceived Discrimination" and "Feelings of Hostility," as well as lower on "Affective Acceptance of Work Atmosphere," the data brought together in this table indicate that younger workers, and particularly those who have completed more years of formal education, show a more positive perception of their supervisor as well as a greater readiness for training than do older and less educated workers.

Variable 9, "Wage Dissatisfaction," shows little relationship to biographical variables except for a positive correlation of moderate significance with number of dependents; it is not surprising that those workers with a greater number of dependents would express a somewhat greater degree of dissatisfaction with their wages. Variable 10, "Dissatisfaction with Rule Changes," is probably tapping a rather isolated and limited kind of dissatisfaction and shows no significant relationships with biographical variables. Variable 11, "Readiness for Upgrading to Supervisory Position," is perhaps a special instance of readiness for training, although it is interesting that these two sets of variables factored out separately. The correlation of this factor with age is in the same direction as the correlation with the "Readiness for Training" factor (i.e. negative), although in this instance the correlation fails to reach statistical significance. However, there is a significant positive correlation between this factor and education, as might be expected from the previous results. Variable 12, "Occupational Self-Confidence," is also probably a rather isolated kind of measure and does not correlate significantly with biographical variables.

Table 50 presents a matrix of intercorrelations between the two sets of composite scores based on the six attitudinal and personality factors presented in Table 48 and the six work attitude factors presented in Table 49. As opposed to Tables 48 and 49 in which we were interested in only those parts of the correlation matrices showing the relationships between the six biographical variables and the attitude variables, here we will be interested in the interrelationships of all twelve attitudinal variables with each other. This presents a

## TABLE 50

## INTERCORRELATIONS OF COMPOSITE SCORES ON 6 ATTITUDINAL AND PERSONALITY FACTORS AND 6 WORK ATTITUDE FACTORS

All Employees (N=328)

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Feelings of Despair | - | 10 | -18** | 19** | -30** | 37** | 04 | 04 | -02 | 25** | -03 | -17** |
| 2. | Perceived Discrimination | | - | 06 | 41** | -17** | 13* | 07 | 12* | 14* | 08 | 13* | -23** |
| 3. | Self-Respect & Compassion for Others | | | - | 00 | 11 | -16** | -03 | 05 | 06 | -09 | 07 | -01 |
| 4. | Distrust of Work Institutions | | | | - | -15** | 19** | -03 | -02 | -02 | 18** | -11 | -10 |
| 5. | Affective Acceptance of Work Atmos. | | | | | - | -28** | 00 | -05 | -17** | -08 | 00 | 25** |
| 6. | Feelings of Hostility | | | | | | - | 04 | 01 | 11 | 11 | -04 | -17** |
| 7. | Readiness for Training | | | | | | | - | 33** | -02 | 00 | 46** | -21** |
| 8. | Positive Perception of Supervisor | | | | | | | | - | -04 | -02 | 14* | -46** |
| 9. | Wage Dissatisfaction | | | | | | | | | - | 03 | 15** | -03 |
| 10. | Dissatisfaction with Rule Changes | | | | | | | | | | - | -03 | -08 |
| 11. | Readiness for Upgrading to Sup. Position | | | | | | | | | | | - | -11* |
| 12. | Occupational Self-Confidence | | | | | | | | | | | | - |

*p ≤ .05; **p ≤ .01.

(Decimal points omitted)

problem of where to begin a discussion attempting to highlight the most salient of the many possible intercorrelations contained in such a table. Since the major focus of the research has at all times been on training, and particularly on the employees' "readiness for training," we will start with the factor to which we have given that name, which happens to be variable 7 in Table 50.

Since we are potentially interested in all of the interrelationships in Table 50, we may wish to examine the intersection of any given variable with any of the other variables along both the vertical and horizontal axes. An inspection of the intersections of variable 7, proceeding vertically down column 7, indicates that "Readiness for Training" does not correlate significantly with any of the six composite scores based on the first set of attitudinal and personality factors. However, a horizontal inspection shows some significant relationships. The most significant one of these is with variable 11, "Readiness for Upgrading" to Supervisory Position." As we have mentioned before, these two factors are manifestly related to each other, even though they factored out separately. In addition to this relationship, "Readiness for Training" correlates positively with "Positive Perception of Supervisor" as does "Readiness for Upgrading to Supervisory Position."

Even though none of the first six factors correlates significantly with "Readiness for Training," they do show a high degree of intercorrelation among themselves. For example, "Feelings of Despair" correlates negatively with "Self-Respect and Compassion for Others," positively with "Distrust of Work Institutions," negatively with "Affective Acceptance of Work Atmosphere" and positively with "Feelings of Hostility." Also, "Perceived Discrimination" shows a high positive correlation with "Distrust of Work Institutions, and so on.

When inspecting the results in Table 48, we also found that many of these first six factors showed significant correlations with age and years of education completed. Table 49, in turn, showed "Readiness for Training" and other work attitude factors to be related to these same biographical variables. Thus, even though "Readiness for Training" shows no significant correlations with the first six factors in

Table 50, it may be indirectly related to these attitudinal and personality factors by way of age and other biographical items, acting as "moderator" variables.[16] When these variables are properly taken into consideration, "Readiness for Training" may be predictable from several attitudinal and personality factors.

We will conclude this discussion of the many possible interrelationships among our variables by summarizing and highlighting three points which we consider of particular relevance to the broad questions of trainee selection and the planning and implementation of training programs:

1. Some attitudinal and personality characteristics of workers which may, at first glance, seem generally negative, or indeed "negativistic," may be considerably more positively related to "Readiness for Training" and related dispositions than one might assume.

2. Furthermore, many of these seemingly negativistic attitudes, held primarily by younger workers, are positively related to our measure of "Positive Perception of Supervisor." Thus, younger workers hold attitudes which are more negative

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[16] See Technical Memorandum RES 119, December 4, 1967.

or critical of "the system," indicating a lesser willingness to acquiesce and accept the status quo than their older, more resigned, co-workers. However, their criticism is directed primarily against the inequities and frustrations which are part of the reality they experience; it is not focused on their immediate supervisor and does not preclude a positive attitude toward training and upgrading.

3. Some seemingly "positive" attitudes which could leave a favorable impression, and possibly predispose an employer or trainer to give preference in trainee selection, may show no, or even a significant negative relationship with "Readiness for Training." For example, in Table 50, "Affective Acceptance of Work Atmosphere" shows no significant relationship to "Readiness for Training" or "Readiness for Upgrading to Supervisory Position." "Occupational Self-Confidence," on the other hand, shows a significantly negative relationship with both "Readiness for Training" and "Readiness for Upgrading to Supervisory Position." Although it would seem that "Occupational Self-Confidence" is a characteristic which would be desirable to have in potential trainees, the empirical evidence presented here shows fairly clearly that subjects who, in

a pre-test are high on this factor (as operationalized by the questions used to obtain a score for this factor - see Table 47, page 151), express significantly less "Readiness for Training."

As we indicated in the previous section, in addition to the two sets of composite scores which have formed the basis for our discussions of Tables 48, 49 and 50, we also performed a factor analysis of a combined set of 68 selected variables based on the highest loading items from the two sets of factor analyses. Twelve factors emerged from this analysis and these are listed on pp. 152-153 of this Volume. Table A-7 (Volume II: Technical Appendix A, p. 49) presents a matrix of intercorrelations of these 12 factors and the six selected biographical variables. Since many of these 12 factors were similar to the other two sets of factors, we will not discuss the results presented in Table A-7 in any further detail here. However, the reader who wishes to inspect this table will find that the intercorrelations contained therein clearly confirm the points summarized in our concluding discussion of the results of Tables 48-50.

## B. An Analysis of Change

The original intent of the study included, in addition to a descriptive analysis of low-skill, low-wage workers, the development of techniques to measure the effect of SAI's skill training programs on the participants. Although this intent was stated at the beginning of the first year of the project, the data gathered during the 1966-67 period were not collected in such a manner as to permit any rigorous statements concerning the effect that training may have had on the discrepancies, if any, between pre- and post-tests. In a preliminary report[17] of this first year of research the lack of adequate control groups was explained by stating that this would be a "case study." It was, and is, the firm conviction of the present writer who has directed the research since October, 1967, that there are already a number of case studies, anecdotal reports and subjective impressions concerning the efficacy of manpower training programs, but an acute lack of "hard" data derived from adequate experimental designs in this area.

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[17] Volume III, "The Low-Wage Employee in His Work Environment: A Study in Depth (Preliminary Findings), Technical Memorandum ADM 400, August 24, 1967.

In a previous working paper[18] we have described in some detail the experimental design used during the second year of the project, which emphasized the necessity for adequate control groups. For readers who are not familiar with this previous working paper, we will summarize briefly here the rationale for the choice of this design as compared with other possible designs.

Figure 1 presents a summary of those pre-experimental and experimental design paradigms most widely used in social science research. Type I design, the One-Shot Case Study, is listed only as a point of departure; it is not an experimental design in any sense, since no basis of comparison is provided. There is neither a pre-test with which to compare post-test results, nor is there a control group.

Type II design provides a minimal basis of comparison by using both a pre-test and a post-test; however, no control group is provided — hence the designation of

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[18] Technical Memorandum RES 119, December 4, 1967.

FIGURE 1

## SUMMARY OF PRE-EXPERIMENTAL AND EXPERIMENTAL DESIGN PARADIGMS

| | TYPE | GROUPS | DESIGN | | |
|---|---|---|---|---|---|
| | | | Pre-Test | Training | Post-Test |
| PRE-EXPERIMENTAL DESIGNS | I: One-Shot Case Study | 1. | - | X | $O_2$ |
| | II: One-Group Pre-Test/Post-Test Design | 1. | $O_1$ | X | $O_2$ |
| | III: Static Group Comparison | 1. | - | X | $O_2$ |
| | | 2. | - | - | $O_2$ |
| EXPERIMENTAL DESIGNS | IV: Pre-Test/Post-Test Control Group Design | 1. | $O_1$ | X | $O_2$ |
| | | 2. | $O_1$ | - | $O_2$ |
| | V: Solomon Four-Group Design | 1. | $O_1$ | X | $O_2$ |
| | | 2. | $O_1$ | - | $O_2$ |
| | | 3. | - | X | $O_2$ |
| | | 4. | - | - | $O_2$ |

$O_1$ = Observation at time 1, i.e. Pre-Test

X = Experimental treatment, in this case Training

$O_2$ = Observation at time 2, i.e. Post-Test

One-Group Pre-Test/Post-Test Design. In this design there are at least five categories of extraneous variables which are not controlled for. This means that the differences between pre-test and post-test may be determined by any of these variables and not by the experimental treatment.

One type of variable which is not controlled for in this design is referred to as the main effects of history, i.e. during the time span between $O_1$ and $O_2$ many events may have occurred in addition to X and any one or combination of these events may have determined the observed differences.

A second type of variable which is uncontrolled for in this design is referred to as maturation. By this we mean effects which are systematic with the passage of time and not, as in the case of history, a function of specific events involved. Thus, in the time interval between $O_1$ and $O_2$, the subjects may have grown older, or in some other way changed their physiological or psychological state, and such changes may have produced the observed differences independently of X.

A third source of extraneous variation which may be a determinant of the observed differences between $O_1$ and $O_2$ has to do with the effects of testing itself. A distinction may be made between reactive measures and nonreactive measures. Most psychological tests, interviews, and the like are reactive measures in that these procedures, in and of themselves, have effects upon the subjects. In contrast, observations such as those made from behind a one-way screen, where the subject is unaware that he is being observed may be nonreactive in nature. In the present study the measures used are clearly reactive.

A fourth source of uncontrolled variance may be referred to as instrument decay. Many "instruments" are involved in the collection of psychological data. The respondent, himself, is one such instrument. He may become tired, impatient or bored in the course of one interview or during the repeated interview. This is particularly true when many of the same questions are asked, as is typically the case when we are obtaining measures of change. In addition to the subject, interviewers, coders and other persons and things may be involved as instruments in the collection of the data; these may all contribute to sources of decay. Thus, this question refers to certain aspects of the reliability of the observations.

A fifth source of uncontrolled variance, which is a special case of the preceding one, should be mentioned. This is statistical regression. Especially with psychlogical measures, certain systematic effects tend to take place during the time interval from $O_1$ to $O_2$ as a result of test-retest unreliability. In particular, there is a tendency for extreme judgments to shift toward the mean, due to random imperfections of the measuring instrument or random instability within the population.

In Type III design, the Static Group Comparison, a control group is involved. This design undertakes a comparison between a group which has experienced X and a group which has not, in order to determine the effects of X. The basic problem lies in the fact that no pre-testing is carried out. Thus, it may not be possible to say whether the two groups of subjects were comparable prior to the time of X; and, even if they were equivalent at that time, they may not be at the time of the post-test if, for instance, a biased subset of subjects has dropped out. This latter problem is referred to as experimental mortality.

The first three types of design in Fig. 1 are pre-experimental since they contain extraneous and uncontrolled sources of variance, thus making it impossible to state with certainty that the observations at time 2 ($O_2$) are due to the experimental treatment, in our case Training. The next two paradigms in Fig. 1 are true experimental designs in that they control for most of the confounding factors encountered in the pre-experimental designs.

Type IV, the Pre-Test/Post-Test Control Group Design, controls for the main effects of history, maturation, testing, instrument decay and regression as well as the problems of selection bias and experimental mortality. There are still some problems that may arise in this design if the observations are made at different times or if more than one experimenter or observer is used; but variations of the design, involving counterbalancing of these factors, can be employed to minimize these effects. This design has been considered the minimum acceptable standard of good research design in the social sciences for the past thirty some years, especially since the pioneering work of R. A. Fisher and his associates (Fisher, 1935).

Although Type IV design controls for the main effects of most of the potentially confounding variables mentioned above, in recent years a serious and avoidable imperfection in this design has been noted. This imperfection has been discussed by Solomon (1949) in terms of the interaction effect of testing with the experimental treatment. This means that observed differences between pre-test and post-test results might not be due solely to the experimental treatment (Training), or even solely to the pre-testing, but rather may result from a sensitization of the subject by the pre-test to the experimental treatment so that when X is preceded by $O_1$ there may be a change, whereas if either X or $O_1$ occurs alone, no change may result. If such an interaction effect occurs, it limits the generalizability of the effects of X upon a particular sample to the unpretested population; and it is usually the unpretested larger universe to which one wants to generalize (Campbell, 1957).

A suggestion for controlling for this problem has been made by Solomon and is represented by Type V design in Fig. 1, which is commonly known in the literature as the Solomon Four-Group Design. This design adds to the traditional two-group experiment two additional unpretested groups, one of which has undergone the experimental treatment and another of which has not. Instead of the bivariate analysis involving t-tests for comparing experimental and control groups, which is appropriate in Design IV, Design V requires the use of multivariate analysis. If the four post-tests are taken as the dependent measure, it can be seen that the Solomon Four-Group Design forms a simple two-by-two analysis of variance design, as illustrated in Figure 2. Thus, it becomes possible, through the use of analysis of variance, to determine the main effects of pre-testing and training, as well as possible interaction effects between the two. It also permits the computation of the within-cell variance (Residual) as a measure of experimental error.

As we indicated in the earlier working paper,[19] we will present the results of the analysis of change in terms of two-by-two analysis of variance tables based on the Solomon Four-Group Design, as illustrated in Fig. 2.

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[19] op. cit.

FIGURE 2

2 X 2 ANALYSIS OF VARIANCE
FOR THE SOLOMON FOUR-GROUP DESIGN

| | Training | No Training |
|---|---|---|
| Pre-Test | (1) | (2) |
| No Pre-Test | (3) | (4) |

In other words, we have four groups of subjects: 1) those who have undergone both pre-testing and training; 2) those who have undergone pre-testing but no training; 3) those who have undergone training but no pre-testing; and 4) those who have undergone neither training nor pre-testing. However, all four groups received the post-test; and it is these post-test results which are entered into the analysis of variance design as dependent variables, allowing us to tease out the differential effects of Training and Pre-Testing, as well as possible interaction effects of the two.

The use of the Solomon Four-Group Design makes certain suppositions concerning the control groups which are used. At least two of these must be gone into briefly here in order to enable the reader to understand certain decisions made by the investigator and certain limits which must be placed on the interpretation of the results. Ideally, in a design of this sort, subjects should be randomly assigned to the four cells of the design to avoid any systematic bias. Because of the realities of the field situation, we were not always able to meet this requirement. To compensate for the fact that it was impossible to meet this stringent requirement of the experimental design, we made comparisons among the four groups wherever possible to determine if there were any systematic sampling biases which would limit the interpretation of the analysis of variance results.

A second problem, closely related to the above one, has to do with what constitutes an adequate control group. That is to say, the subjects in cell 2 (see Fig. 2) should not only be sampling equivalents of those in cell 1 in terms of relevant variables prior to the experimental treatment, but they should also differ from cell 1 subjects in not being affected by the experimental treatment (Training). During the first year of the project not only were insufficient data collected which fulfilled the requirements of cells 3 and 4, but the only data which came close to fulfilling the requirements of cell 2 was that collected from workers who had not themselves undergone training, but who were from the same organizations (and often the same departments) as the trainees. Since the "informal system" of communication is very important in most work organizations, it may be assumed that these non-trainees heard a great deal about the training programs even though they did not participate in them; furthermore, it is quite possible that their non-selection for training could have had an effect upon them. In any case, there is reason to question their suitability as a control group which is independent of the effects of the experimental treatment, namely Training.

It was for this reason that, during the second year of the project, in addition to collecting additional data in the other three cells, we were particularly concerned with collecting data for cell 2, which would provide us with an experimentally independent control group. This data was collected at Hospital G; the distribution of employees and organizations, in what we have called Design I, is presented in Table 51. The alternate case, which we have called Design II, in which non-trainees

## TABLE 51

## DISTRIBUTION OF EMPLOYEES STUDIED IN TERMS OF A SOLOMON FOUR-GROUP DESIGN

### Design I: Experimentally Independent Control Group

| GROUP CONDITION | | | | ORGANIZATION | N |
|---|---|---|---|---|---|
| | (Pre-Test) | (Training) | (Post-Test) | | |
| 1. | $O_1$ | X | $O_2$ | Hospital A | 6 |
| | | | | Hospital B | 9 |
| | | | | Mfg. Firm W | 9 |
| | | | | Total | 24 |
| 2. | $O_1$ | - | $O_2$ | Hospital G | 24 |
| | | | | Total | 24 |
| 3. | - | X | $O_2$ | Hospital D | 8 |
| | | | | Hospital F | 17 |
| | | | | Total | 25 |
| 4. | - | - | $O_2$ | Hospital C | 97 |
| | | | | Mfg. Firm Y | 16 |
| | | | | Total | 113 |

from the same institutions were used as the control group in cell 2, is described in terms of the same distribution in Table 52.

As we indicated earlier, since we were not free to randomly assign subjects to the four conditions, as is theoretically required by the rigorous use of the Solomon Four-Group Design, we investigated the comparability of the four groups as thoroughly as possible. Since groups 3 and 4 did not receive the pre-test, we could not completely determine comparability of attitudinal and other psychological variables prior to the training or post-test. However, what we could and did do was to determine the comparability of all four groups with respect to biographical and other factual background variables which would not change between pre-test and post-test, but which may be important mediating factors in the determination of change. Actually, we not only compared each of the four groups with each other, but we compared the subjects in each of the organizations, taking every possible combination of organizations, two at a time, and, by the use of t-tests, tested for the significance of mean group differences. Correcting the t-value by means of the Scheffé (1953) method, which constitutes a very rigorous criterion, we found virtually no differences that were of such a magnitude as to invalidate

## TABLE 52

## DISTRIBUTION OF EMPLOYEES STUDIED IN TERMS OF A SOLOMON FOUR-GROUP DESIGN

### Design II: Interdependent Non-Trainee Control Group

| GROUP CONDITION | | | | ORGANIZATION | N |
|---|---|---|---|---|---|
| | (Pre-Test) | (Training) | (Post-Test) | | |
| 1. | $O_1$ | X | $O_2$ | Hospital A | 6 |
| | | | | Hospital B | 9 |
| | | | | Mfg. Firm W | 9 |
| | | | | Total | 24 |
| 2. | $O_1$ | - | $O_2$ | Hospital A | 55 |
| | | | | Hospital B | 67 |
| | | | | Total | 122 |
| 3. | - | X | $O_2$ | Hospital D | 8 |
| | | | | Hospital F | 17 |
| | | | | Total | 25 |
| 4. | - | - | $O_2$ | Hospital C | 97 |
| | | | | Mfg. Firm Y | 16 |
| | | | | | 113 |

the use of analysis of variance within the Solomon Four-Group Design. Some differences which did exist, but were of low magnitude, will be referred to in discussing some of the results.

The subjects in cells 1 and 2 of the design can be compared directly with respect to attitudinal variables, since both received pre-tests. As might be expected, there were no significant differences between the experimental subjects in cell 1 (trainees) and the "control" subjects in cell 2 of Design II, represented by non-trainees from the same organizations. In other words, the non-trainees in Design II represent a "better" control group - at least as far as sampling equivalency is concerned. However, as we have pointed out, this "control" group is contaminated in the sense that it is not experimentally independent of the cell 1 subjects. The control subjects in cell 2 of Design I (Table 51) are, on the other hand, experimentally completely independent of the subjects in cell 1 and, thus, represent a better control group even though we may have to worry more about sampling equivalency.

Table 53 presents a comparison between the trainees (experimental subjects) and non-trainees (control subjects) from Design I in terms of the pre-test scores on the six factors from 4 atti-

TABLE 53

## COMPARISON OF EXPERIMENTAL AND CONTROL GROUPS' PRE-TEST SCORES
(Design I)

Composite Scores on 6 Factors from 54 Attitudinal and Personality Items

| Variable | Trainees (Experimental Group) (N=24) | | Non-Trainees (Control Group 1) (N=24) | | Mean Diff. | df | t-value |
|---|---|---|---|---|---|---|---|
| | $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 1.Feelings of Despair | 1.91 | 0.75 | 1.63 | 0.49 | 0.28 | 46 | 1.50 |
| 2.Perceived Discrimination | 2.34 | 0.89 | 2.21 | 0.78 | 0.13 | 46 | 0.54 |
| 3.Self-Respect and Compassion for Others | 3.92 | 0.19 | 4.12 | 0.45 | -0.20 | 46 | -2.04* |
| 4.Distrust of Work Institutions | 1.81 | 0.68 | 1.63 | 0.55 | 0.18 | 46 | 1.00 |
| 5.Affective Acceptance of Work Atmosphere | 3.79 | 0.34 | 4.03 | 0.53 | -0.23 | 46 | -1.84 |
| 6.Feelings of Hostility | 1.31 | 0.68 | 1.38 | 0.54 | -0.08 | 46 | -0.43 |

$*p \leq .05$; $**p \leq .01$; $***p \leq .001$

$\overline{X}$= Arithmetic Mean
S.D. Standard Deviation

tudinal and personality items. As may be seen from an inspection of Table 53, there is very little difference between the experimental and control groups in terms of their pre-test scores on these general attitudinal and personality items, even though the control group was taken from a different organization (Hospital G) in order to ensure experimental independence. As we mentioned earlier, the differences were even less significant on these items, as well as on other measures, between the experimental and control subjects in Design II, where the "controls" were non-trainees from the same organizations. For this reason, we will focus our attention on the results from Design I, where the control subjects are not "contaminated" by the experimental treatment - even though, as we shall see, there are some problems of sampling equivalency.

Table 54 presents a comparison between the experimental subjects (trainees) and control subjects from Design I in terms of their pre-test scores on six of the work attitude factors. In the case of these variables, significant differences appear on two out of the six factors, illustrating the deviation from complete sampling equivalency, which we had to accept as the price to be paid for an experimentally independent control group, given the limitations of availability of subjects.

## TABLE 54

### COMPARISON OF EXPERIMENTAL AND CONTROL GROUPS' PRE-TEST SCORES
(Design I)

Composite Scores on 6 Factors from 48 Work Attitude Variables

| Variable | Trainees (Experimental Group (N=24) | | Non-Trainees (Control Group I) (N=22) | | Mean Diff. | df | t-value |
|---|---|---|---|---|---|---|---|
| | $\overline{X}$ | S.D. | $\overline{X}$ | S.D. | | | |
| 1. Expressed Readiness for Training | 4.03 | 0.70 | 4.39 | 0.27 | 0.36 | 44 | 2.27* |
| 2. Positive Perception of Supervisor | 2.87 | 1.02 | 4.09 | 0.61 | 1.22 | 44 | 4.88*** |
| 3. Wage Dissatisfaction | 3.20 | 0.66 | 3.36 | 0.72 | 0.16 | 44 | 0.78 |
| 4. Dissatisfaction with Rule Changes | 3.14 | 0.84 | 2.88 | 0.99 | -0.26 | 44 | -0.96 |
| 5. Expressed Readiness for Upgrading to Supervisory Position | 3.80 | 0.79 | 3.59 | 0.99 | -0.21 | 44 | -0.81 |
| 6. Occupational Self-Confidence | 3.72 | 0.75 | 3.35 | 0.72 | -0.36 | 44 | -1.68 |

$^{*}p \leq .05$; $^{**}p \leq .01$; $^{***}p \leq .001$

$\overline{X}$ = Arithmetic Mean
S.D.= Standard Deviation

It is not surprising that comparisons between subjects from different organizations would show more significant differences on the fairly specific work attitude factors in Table 54 than on more general attitudinal and personality items such as those presented in Table 53. The highly significant difference between trainees and control subjects on variable 2 in Table 54 ("Positive Perception of Supervisor") is quite probably explainable on the basis of the descriptive results presented in Tables 1 and 2, which show that nearly all of the employees and all of the supervisors at Hospital G, which constitute our control group for this design, are Black; on the other hand, while most of the employees in the organizations from which the trainees (experimental group) come are Black or Puerto Rican, the majority of their supervisors are White. This same set of circumstances may explain the somewhat higher score of the control subjects on variable 1 ("Expressed Readiness for Training"), although the difference here is less significant. At any rate, such differences must be taken into account when interpreting the analysis of variance results based on this experimental design.

Earlier in this chapter we have described the experimental design paradigm which we have used to determine the source of possible change which might manifest itself in the post-test (see Fig. 2, p. 182). The four cells in this design represent groups of subjects, each of which has undergone one of four possible combinations of pre-testing, no pre-testing, training and no training. Since all four groups received the post-test, it is these results that are entered into the four cells of the design. By performing an analysis of variance on the 2 x 2 design, it is then possible to determine the extent to which the observed data are the result of Pre-Testing as a main effect, Training as a main effect, or Pre-Testing x Training as an interaction effect. In the following tables we will present a summary of the analysis of variance results based on what we have called Design I.

Tables 55a-55f present a summary of the analysis of variance results based on the employees' post-test scores on the six factors from the 54 attitudinal and personality items. In the left-hand column of Table 55-a the "Source" of the variance is listed; in our study the sources of variance that we are interested in are the main effects of Pre-Testing, the main effects of Training and the interaction effect of these two (Pre-Testing x Training). The "Residual" is the result of the within-cell variance or individual differences between subjects

## TABLE 55

## SUMMARY OF ANALYSIS OF VARIANCE

## EFFECTS OF TRAINING AND PRE-TESTING ON EMPLOYEES' POST-TEST SCORES ON 6 FACTORS FROM 54 ATTITUDINAL AND PERSONALITY ITEMS

(Design I)

a. Factor I: "Feelings of Despair"

| Source | Sums of Squares | df | Mean Squares | F-Ratio | Percent Variance+ |
|---|---|---|---|---|---|
| Pre-Testing | 1.18 | 1 | 1.18 | 2.36 | 1.26 NS |
| Training | .51 | 1 | .51 | 1.03 | .55 NS |
| Pre-T. x Tr. | .99 | 1 | .99 | 1.99 | 1.06 NS |
| Residual | 90.78 | 182 | .50 | | |
| Total | 93.46 | 185 | | | |

b. Factor II: "Perceived Discrimination"

| Source | Sums of Squares | df | Mean Squares | F-Ratio | Percent Variance |
|---|---|---|---|---|---|
| Pre-Testing | .21 | 1 | .21 | .26 | .14 NS |
| Training | 4.53 | 1 | 4.53 | 5.60 | 2.98 * |
| Pre-T. x Tr. | .05 | 1 | .05 | .06 | .03 NS |
| Residual | 147.13 | 182 | .81 | | |
| Total | 151.92 | 185 | | | |

+Levels of significance are indicated next to the Percent Variance as follows: NS = Non-significant; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

(continued)

TABLE 55 -- continued

c. Factor III: "Self-Respect and Compassion for Others"

| Source | Sums of Squares | df | Mean Squares | F-Ratio | Percent Variance |
|---|---|---|---|---|---|
| Pre-Testing | 16.23 | 1 | 16.23 | 57.07 | 23.72*** |
| Training | .21 | 1 | .21 | .75 | .31 NS |
| Pre-T. x Tr. | .23 | 1 | .23 | .80 | .33 NS |
| Residual | 51.74 | 182 | .28 | | |
| Total | 68.41 | 185 | | | |

d. Factor IV: "Distrust of Work Institutions"

| Source | Sums of Squares | df | Mean Squares | F-Ratio | Percent Variance |
|---|---|---|---|---|---|
| Pre-Testing | .06 | 1 | .06 | .12 | .07 NS |
| Training | 1.64 | 1 | 1.64 | 3.54 | 1.88 NS |
| Pre-T. x Tr. | 1.19 | 1 | 1.19 | 2.57 | 1.37 NS |
| Residual | 84.44 | 182 | .46 | | |
| Total | 87.33 | 185 | | | |

(continued)

TABLE 55 -- continued

e. Factor V: "Affective Acceptance of Work Atmosphere"

| Source | Sums of Squares | df | Mean Squares | F-Ratio | Percent Variance |
|---|---|---|---|---|---|
| Pre-Testing | 1.36 | 1 | 1.36 | 4.39 | 1.73* |
| Training | 6.43 | 1 | 6.43 | 20.70 | 8.16** |
| Pre-T. x Tr. | 14.49 | 1 | 14.49 | 46.64 | 18.38*** |
| Residual | 56.56 | 182 | .31 | | |
| Total | 78.84 | 185 | | | |

f. Factor VI: "Feelings of Hostility"

| Source | Sums of Squares | df | Mean Squares | F-Ratio | Percent Variance |
|---|---|---|---|---|---|
| Pre-Testing | 2.15 | 1 | 2.15 | 3.41 | 1.83 NS |
| Training | .12 | 1 | .12 | .18 | .10 NS |
| Pre-T. x Tr. | .28 | 1 | .28 | .45 | .24 NS |
| Residual | 114.78 | 182 | .63 | | |
| Total | 117.33 | 185 | | | |

within the cells and may be considered a measure of the "experimental error." The parts of the table that we are particularly interested in, however, are the last column, which indicates the percent variance accounted for by any given source, and the next to last column listing the F-Ratio, which is used in determining the statistical significance of the percent variance accounted for by a given source. For the sake of convenience, we have placed the symbol indicating the significance levels next to the percent variance.

As may be seen from Table 55-a, neither Pre-Testing, nor Training, nor an interaction of the two have any significant effect on this particular variable, i.e. "Feelings of Despair." This is not necessarily surprising since this variable may be a reflection of individual problems which are not so readily amenable to change in the relatively brief training period. Furthermore, it must be borne in mind that we are not dealing with every possible conceptualization of "feelings of despair," but rather with our subjects' mean responses to the four questions which constitute our particular operational definition of "Feelings of Despair" (see Factor I, Table 46, p. 139). In general, extreme caution must prevail in making generalizations on the basis of the absence of significant findings.

This can often lead to what is referred to by statisticians as a "beta-type error" (McNemar, 1962).

Table 55-b presents a summary of the analysis of variance results based on the variable of "Perceived Discrimination" (Factor II, Table 46, p. 140). Here we see a clear-cut main effect of Training. This means that employees who have undergone training show a greater amount of "Perceived Discrimination" on the post-test than employees who have not undergone training. Although this finding may, at first glance, seem unexpected, there is a very likely explanation for it. Although, most of the trainees were minority group members, many of them may have been somewhat inhibited in the interview situation in their expression of feelings of discrimination, especially when the interviewer was White, as was often the case. During the training sessions, however, the trainers, many of whom are minority group members themselves, encouraged the trainees to be aware of their feelings and more willing to express them openly. They also, of course, encouraged them to do something about the problems which they perceived and provided realistic opportunities for constructive action by means of skill training directly related to the job, as well as training in "human relations" skills, which emphasizes helping the trainees to function more effectively at home and in the community, and which takes into account the fact that many of the problems encountered in these areas also come into play in the work situation. It may be worthwhile to note at this point that, in our analysis of the relationships among variables, "Perceived Discrimination" was significantly positively related to "Readiness for Upgrading to Supervisory Position" and "Positive Perception of Supervisor," indicating that such "awareness" is more likely to be associated with motivation in the direction of constructive upward mobility in the economic system. Thus, the finding that SAI's training program leads to an increase in "Perceived Discrimination" is not only not surprising, but it is not at all undesirable.

As Table 55-c shows, the variable which we have entitled "Self-Respect and Compassion for Others" (Factor III, Table 46, p. 141) shows neither a significant main effect of Training nor any significant interaction effects, although it does show a highly significant main effect of Testing. Actually, this factor was probably misnamed, for though on the surface the items making up this factor may appear to be measuring something like "Self-Respect and Compassion for Others," it is more probable that they merely reflect a tendency on the part of respondents to present themselves in a favorable light. As such, the items are probably measuring a social desirability response set. Measures of social desirability typically show a significant effect of testing in an analysis of variance design. Again the reader must be cautioned against concluding from these results that the training actually had no effect upon "self-respect" or some similar variables; it may well be that we simply did not succeed in measuring such changes.

Table 55-d presents the analysis of variance results for the variable entitled "Distrust of Work Institutions." Neither Pre-Testing, nor Training, nor an interaction of the two accounts for any significant percentage of variance. It is quite plausible that this factor is tapping a basic attitude that is not that easily changed in a limited training period. Also, we must emphasize again that our discussion is limited to the particular way in which this variable was measured, (Factor IV, Table 46, p. 141). As can be seen from an inspection of the items which make up this factor, it got its name ". . . Work Institutions" from the fact that items expressing attitudes toward employers and unions loaded together on the same factor. Thus, it is possible that some changes occurred in attitudes toward one or the other of these institutions, but that this shift was "washed out" by using a composite score as the input for Table 55-d.

Table 55-e, presenting the analysis of variance results for the variable of "Affective Acceptance of Work Atmosphere," (Factor V, Table 46, p. 142) demonstrates clearly the usefulness of the Solomon Four-Group Design which permits the computation of interaction effects. An inspection of the cell means for the four groups in the experimental design shows that subjects who have received either training alone with no pre-testing (cell 3), or pre-testing alone with no training (cell 2), as well as subjects who have received both pre-testing and training (cell 1), show very favorable mean responses to this measure of "Affective Acceptance of Work Atmosphere," whereas subjects who have received neither pre-testing nor training show a significantly less favorable mean response to this variable.

Although the significant interaction effect between Pre-Testing and Training means that one must qualify any generalizations from our sample to the unpretested population concerning the impact that Training alone would have on this variable, we can look at positive implication of these results as well. If

Training alone has a certain positive effect upon the "Affective Acceptance of Work Atmosphere" on the part of trainees, but Training plus Pre-Testing (including, of course, questions concerning "affective acceptance or work atmosphere") also has a significant effect, what is it about the pre-testing that leads to this result? We are not suggesting that all training programs be preceded by extensive pre-testing as, indeed, this would probably be most inefficient. However, through close collaboration between trainers and researchers, it is possible, not only to constantly improve training programs on the basis of research results, but also to incorporate in such programs those aspects of pre-testing which have been shown to provide a "booster" effect in accomplishing the goals of training.

Table 55-f shows no significant effects for the variable which we have called "Feelings of Hostility," (Factor VI, Table 46, p. 142). The most probable explanation of this is the same as that suggested for Table 55-a, "Feelings of Despair," namely that this variable may be a reflection of individual problems not easily amenable to change in the training program; also, we are not talking about "feelings of hostility" in general, but only in terms of the subjects' responses to the questions which we used to operationalize this variable.

Tables 56a-d present the analysis of variance results based on four of the work attitude factors described in the previous section (Table 47, p. 146ff). Since the entries for the analysis of variance were based on post-test results, a discrepancy exists between the seven factor solution presented earlier and the fact that only four factors are being presented here. In the case of three of the seven factors, some or all of the questions logically had to be deleted from the post-test (e.g., Q. 131 - "Would you be interested in getting a better job at more pay here?") since most of the post-tested employees had just completed training programs.

Table 56-a presents the analysis of variance results for the factor which we have called "Positive Perception of Supervisor." As may be seen, both Pre-Testing and Training account for significant percentages of variance ($p \leq .05$) as main effects, with no significant interaction effect occurring. This means that there is no apparent reason why we cannot - within the limits of probability - generalize the findings for the two main effects to the larger unpretested population from which our sample was taken. A systematic inspection of the cell means for the four groups in the experimental design shows that, while both Pre-Testing and Training show significant main effects, the

## TABLE 56

## SUMMARY OF ANALYSIS OF VARIANCE

## EFFECTS OF TRAINING AND PRE-TESTING ON EMPLOYEES' POST-TEST SCORES ON 6 FACTORS FROM 48 SELECTED ATTITUDE VARIABLES

(Design I)

a. Factor III: "Positive Perception of Supervisor"

| Source | Sums of Squares | df | Mean Squares | F-Ratio | Percent Variance+ |
|---|---|---|---|---|---|
| Pre-Testing | 4.70 | 1 | 4.70 | 5.16 | 2.70* |
| Training | 4.23 | 1 | 4.23 | 4.65 | 2.43* |
| Pre-T. x Tr. | .62 | 1 | .62 | .68 | .36 NS |
| Residual | 164.88 | 181 | .91 | | |
| Total | 174.43 | 184 | | | |

b. Factor IV: "Wage Dissatisfaction"

| Source | Sums of Squares | df | Mean Squares | F-Ratio | Percent Variance |
|---|---|---|---|---|---|
| Pre-Testing | .62 | 1 | .62 | 1.53 | .77 NS |
| Training | 1.73 | 1 | 1.73 | 4.28 | 2.15* |
| Pre-T. x Tr. | 4.89 | 1 | 4.89 | 12.13 | 6.10** |
| Residual | 72.98 | 181 | .40 | | |
| Total | 80.22 | 184 | | | |

+Levels of significance are indicated next to the Percent Variance as follows: NS = Non-significant; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

(continued)

TABLE 56 -- continued

c. Factor V: "Dissatisfaction with Rule Changes"

| Source | Sums of Squares | df | Mean Squares | F-Ratio | Percent Variance | |
|---|---|---|---|---|---|---|
| Pre-Testing | 1.14 | 1 | 1.14 | 1.52 | .81 | NS |
| Training | 2.05 | 1 | 2.05 | 2.73 | 1.46 | NS |
| Pre-T. x Tr. | 1.02 | 1 | 1.02 | 1.37 | .73 | NS |
| Residual | 135.92 | 181 | .75 | | | |
| Total | 140.13 | 184 | | | | |

d. Factor VII: "Occupational Self-Confidence"

| Source | Sums of Squares | df | Mean Squares | F-Ratio | Percent Variance | |
|---|---|---|---|---|---|---|
| Pre-Testing | .81 | 1 | .81 | 1.50 | .81 | NS |
| Training | .50 | 1 | .50 | .93 | .50 | NS |
| Pre-T. x Tr. | .85 | 1 | .85 | 1.56 | .84 | NS |
| Residual | 97.98 | 181 | .54 | | | |
| Total | 100.14 | 184 | | | | |

effects are in opposite directions. Training leads to an increase in "Positive Perception of Supervisor," while Pre-Testing leads to a decrease. The significant increase in the subjects' mean response on this variable as a function of training is, of course, an intended effect of our High Intensity Training program, particularly those aspects emphasizing human relations skills; the content of this training is described in greater detail elsewhere.[20] The lowering of the score on this variable, as a function of pre-testing, is an unintended effect but one which, nevertheless, requires explanation (an inspection of the comparable results for Design II - not presented here for reasons of space - reveals essentially the same results, even though different control groups were utilized). The probable explanation of this finding may be the following: Many workers have latently negative perceptions of their supervisors, but may, for a number of reasons, be disinclined to reveal these to the interviewer in the pre-test. The interview, however, heightens the saliency of these attitudes. At the time of the post-test, when the same questions are asked again, not only has the saliency of the attitudes toward the supervisor been heightened, but the interviewee may also have developed greater

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[20] Volume II, "Upgrading Low-Wage Workers in the Plant Environment Through High Intensity Training," Technical Memorandum ADM 400, August 31, 1967.

"trust" in the interviewer and be more willing to reveal his "real" feelings. Thus, this finding, though unexpected, should be taken into consideration if we wish to fully understand the relationship between employees and their supervisors. It should be noted, incidentally, that this finding would not have manifested itself had we used a less ambitious experimental design such as the Pre-Test/Post-Test Control Group Design (see Fig. 1, p. 175).

The results displayed in Table 56-b show that Pre-Testing, as a main effect, accounts for no significant amount of variance on our measure of "Wage Dissatisfaction," although, as might be expected, Training does account for a significant amount of variance on this variable. The interaction effect of Pre-Testing x Training accounts for an even larger amount of variance, suggesting that Pre-Testing may have an indirect influence. An inspection of the cell means for the four groups in this design shows clearly that Training leads to a decrease in "Wage Dissatisfaction," especially when the two groups who have not undergone Pre-Testing are compared. However, the significant interaction effect means that we must exercise caution in generalizing these results to the unpretested population.

Tables 56-c and 56-d show no significant effects for Factor V ("Dissatisfaction with Rule Changes") and Factor VII ("Occupational Self-Confidence"), of the work attitude factors. These two factors accounted for a smaller amount of variance in the factor analysis and were less clearly interpretable than the other factors in this series. This may explain why they show no significant results in the analysis of variance design.

## C. Predictive Validity: A Pilot Study

In addition to the descriptive analyses and an analysis of the effect of the training program on the employees, which were reported in the preceding chapters, we were also interested in the question of how pre-test variables might be predictive of later trainee success on the job. Time and funding considerations limited us in the collection of this data to a very small number of subjects, so this aspect of the study must be considered strictly exploratory in nature.

As we have mentioned earlier, our interest in predictive validity is directed not so much toward trainee selection as it is toward providing information which may be used in the designing of more effective training programs. For example, if we find that variable "X" (which may represent an attitude or some other characteristic, as tapped by one of our measures) is highly predictive of trainee success, our intent would not be to select out potential trainees on the basis of this characteristic, but rather would be to structure our training program so as to encourage the development of such characteristics. This distinction is central to an understanding of the difference between our training philosophy and that which underlies much traditional industrial training. The use of so-called "aptitude testing" in the traditional industrial setting, with an emphasis on exclusion rather than inclusion, is not only questionable from an ethical point of view but is also of dubious validity from a purely statistical point of view; even the most widely used "standard" measures in personnel selection show far from perfect validity, as Fleischman (1967), among others, has pointed out.

When tests are involved which have been standardized on White subjects and are subsequently used to test members of minority groups, the probability of accurate prediction becomes even more questionable. This has been recognized for some time in the area of educational psychology (at least at the research level; the translation of these findings into changes in practice has been painfully slow). However, research on this problem in the area of vocational aptitudes has been of rather recent origin. Thus, for example, Kirkpatrick et al. (1968) demonstrated that an aptitude test for nurses' training, which had been standardized on White middle class subjects, showed significant predictive validity for White nurses when measured against supervisory ratings as the criterion variable, whereas the same test showed essentially zero predictive validity, utilizing the same criterion variable, when applied to Black nurses.

Our own study which, due to the aforementioned limitations, was only of a pilot nature, was directed primarily at the development of appropriate criterion variables. In studying predictive validity, one is concerned with the relationship between two types of variables: 1) the predictor variables, which may be any sort of pre-test information obtained through interviews or other means from which one wishes to predict, (in our case, we used the two sets of composite scores based on the factor analyses of the pre-test items presented in Tables 46 and 47, p. 139ff and p. 146ff, as well as selected biographical variables); and 2) the criterion variables, which are some sort of task related measures that serve as criteria of good job performance; the degree to which the predictor variables correlate with the criterion variables is usually taken as the measure of their predictive validity.

The difficult task in studying predictive validity lies in identifying adequate criterion variables. These variables are frequently classified as being either "objective" or "subjective." "Objective" variables are things such as absenteeism, tardiness, production and efficiency, where these can be measured, and similar things. At first glance, it would seem that this class of criterion variables would be preferable for use in a study of predictive validity. However, absenteeism, tardiness and similar behavioral manifestations may be due to a variety of causes, not all of them work-related. Production, efficiency and similar measures may not be readily obtainable for certain types of jobs or, for that matter, may not be relevant criteria for the purposes at hand.

The "subjective" class of variables usually refers to rating scales and related measures of performance appraisal obtained from the subject's first or second-line supervisor, his peers or, in some cases, from the subject himself. Although there are some difficulties involved in all of these procedures, ratings obtained from the subject's first-line supervisor constitute the most widely used type of criterion variables and it was this route that we decided to go in this pilot study.

After an extensive review of the literature concerning performance appraisal and other types of criterion measures used to establish the predictive validity of pre-test measures, a set of 21 rating scales was selected for this pilot study. Because of time limitations, we were able to include this part of the Study in only one of the eleven organizations which we studied, namely Manufacturing Firm W. Unfortunately, there were only eleven trainees at this organization; thus, in order to increase our number of observations, for statistical purposes, we had these eleven trainees rated both by their first-line supervisor and by the SAI trainer. The exact form of the rating scale is reproduced in Volume III, Part 2, Appendix B-5, Trainee Performance Rating Form.

On the basis of the 22 observations, obtained from the ratings of both supervisors and trainer, the 21 items contained in the rating forms were factor analyzed. A five factor solution seemed optimal and the results of this analysis are presented in Table 57, together with a tentative labeling of the five selected factors. (A more complete presentation of these results, listing the loading for each variable on each factor, is presented in Table A-12, Volume II: Technical Appendix A).

In spite of the pilot nature of this study, e.g., the number of observations and subjects with which we were dealing was quite small, and we were, furthermore, limited to data gathered from one particular firm, still, the factors in Table 57 do "make sense" and suggest some interrelationships which may be worth commenting upon briefly.

Factor I is general in nature and, in keeping with the fact that the organization studied was a manufacturing firm, contains several items relating to productivity. In interpreting this factor, we also noted that the one scale which dealt with "general performance" had a high loading and we, consequently, named the factor "General Work Performance."

The two items having high loadings on Factor II are clearly related and suggest the name of "Social Adaptability."

We have labeled Factor III "Conscientiousness" since it very

## TABLE 57

### Factor Analysis of 21 Trainee Performance Rating Items (N=22 Observations)

Selected Items from 5 Varimax Rotated Factors

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | Factor I: General Work Performance | | | |
| 3 | How dependable is the worker in carrying through what is expected of him? 1=Extremely dependable; 7=Extremely undependable | .74 | | |
| 4 | Is the worker able to accept responsibility? 1=Extremely able; 7=Extremely unable | .77 | | |
| 12 | What is the worker's average work output? 1=Much above average; 7=Much below average | .86 | | |
| 13 | What is your estimate of the worker's quality of work output? 1=Consistently high quality; 7=Consistently low quality | .69 | | |
| 15 | What is the worker's ability to keep the flow of work paced properly? 1=Very able; 7=Very unable | .87 | | |

(continued)

TABLE 57 --continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | **Factor I: General Work Performance --continued** | | | |
| 20 | How much promotion potential for the next job level do you think the worker has? 1=Much above average; 7=Much below average | .70 | | |
| 21 | How would you rate the worker's general performance? 1=Much above average; 7=Much below average | .72 | | |
| | | | 23.62 | 23.62 |
| | **Factor II: Social Adaptability** | | | |
| 17 | How able is the worker in getting along with other workers? 1=Extremely able; 7=Has great difficulty | -.80 | | |
| 18 | How able is the worker in getting along with other group leaders? 1=Extremely able; 7=Has great difficulty | -.90 | | |
| | | | 13.54 | 37.17 |

(continued)

TABLE 57 --continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | **Factor III: Conscientiousness** | | | |
| 5 | How punctual is the worker? 1=Always on time; 7=Very frequently late | .83 | | |
| 6 | How often is the worker out for other than medical reasons? 1=Very often; 7=Almost never | -.84 | | |
| 7 | To what extent does the worker know the rules and regulations of the company? 1=Extremely knowledgeable; 7=Extremely unknowledgeable | -.76 | | |
| | | | 11.73 | 48.89 |
| | **Factor IV: Craftsmanship** | | | |
| 2 | How easy is it for the worker to learn new duties? 1=Extremely easy; 7=Extremely difficult | -.56 | | |
| 9 | How adequate is the employee's technical knowledge? 1=Very adequate; 7=Very inadequate | -.88 | | |
| 10 | How skilled is the employee in his use of machines and equipment? 1=Very skilled; 7=Total lack of skill | -.92 | | |

(continued)

TABLE 57 --continued

| Item Number | Item | Varimax Rotated Loadings | Pct. Var. | Cum. Pct. Var. |
|---|---|---|---|---|
| | **Factor IV: Craftsmanship --continued** | | | |
| 11 | How much care does the employee exercise to prevent damage or misuse of property and equipment? 1=Extremely careful; 7=Extremely careless | -.74 | | |
| 19 | How interested do you think the worker is in improving himself? 1=Very interested; 7=Very disinterested | -.72 | | |
| | | | 21.81 | 70.70 |
| | **Factor V: Compliance** | | | |
| 8 | To what extent does the worker break company rules and regulations? 1=Almost never; 7=Very often | -.59 | | |
| 16 | How able is the worker in getting along with his foreman? 1=Extremely able; 7=Has great difficulty | -.82 | | |
| | | | 8.88 | 79.58 |

clearly relates punctuality and absenteeism; workers who are rated in the direction of being "very frequently late" also tend to be perceived as often being "out for other than medical reasons." It is not immediately evident why such workers also tend to be rated as "extremely knowledgeable" with regard to the rules and regulations of the company. One could speculate concerning this relationship, but it must be remembered that the N is small, thus increasing the probability of artifacts.

Factor IV, which we have tentatively named "Craftsmanship," is the only factor specifically related to job skills of the sort one would expect in a manufacturing firm. It is interesting to observe that the item relating to prevention of damage to property and equipment has a high loading on this factor. It is perhaps even more interesting that the extent to which the worker is thought to be interested in improving himself generally has a high loading on this factor.

Factor V is characterized by high loadings on two items. One of these has to do with the extent to which the worker breaks "company rules and regulations." Since a low score on this item would indicate that the worker almost never breaks "company rules and regulations," we have tentatively designated this factor "Compliance." Of considerable interest is the fact that the other item - which has an even higher loading on this factor - has to do with the ability of the worker to get "along with his foreman." Again, it must be remembered that the judges are mostly first-line supervisors. Although, of course, we need more data in order to draw definite conclusions, if further research bears out the above relationship, then we must seriously question the validity of using the judgements of first-line supervisors as adequate criterion variables.

The next step in this pilot study of predictive validity was to obtain composite scores for each subject, based on his supervisor's rating of him on the five factors described in Table 57, which we have designated as our criterion variables, and then to correlate these with selected pre-test measures, including both biographical variables and composite scores on attitudinal variables. Table 58 presents this matrix of correlations between the five criterion variables and 40 selected pre-test variables. Due to the very small sample, the magnitude of the correlation coefficient required for statistical significance was very high. (Of the eleven subjects for whom we had supervisor and trainer ratings on the criterion variables, two had

## TABLE 58

## CORRELATIONS OF 5 COMPOSITE SCORES FROM 21 TRAINEE PERFORMANCE RATING ITEMS WITH SELECTED BIOGRAPHICAL VARIABLES AND PRE-TEST ATTITUDE MEASURES
(N=9)

| PREDICTOR VARIABLES | CRITERION VARIABLES | | | | |
|---|---|---|---|---|---|
| | FACTOR I General Work Performance | FACTOR II Social Adaptability | FACTOR III Conscientiousness | FACTOR IV Craftsmanship | FACTOR V Compliance |
| 1. Age | 78* | 13 | - 26 | 20 | 67* |
| 2. Mos. on Present Job | - 21 | -34 | 04 | 28 | 05 |
| 3. Minutes to Work | - 69* | 07 | 59 | - 54 | - 55 |
| 4. Weekly Take-Home Pay | 05 | 10 | - 34 | 32 | 29 |
| 5. Yrs. Educ. Completed | 47 | 18 | 37 | 30 | 53 |
| 6. Expected Pay in One Year | 23 | -41 | - 29 | - 64 | - 18 |
| 7. Expected Pay in Five Years | 09 | -15 | - 29 | - 72* | - 05 |
| 8. Mos. in City | 60 | -46 | - 01 | 17 | 23 |
| 9. No. Dependents | - 52 | 08 | - 24 | 07 | - 20 |
| 10. Discrep. Between Present Pay and Amount Needed to Get Along | - 69* | -04 | 17 | - 16 | - 81** |
| 11. Discrep. Between Present Pay and Amount Needed to be Comfortable | - 69* | 09 | 40 | 14 | - 43 |
| 12. Feelings of Despair (1) | - 30 | 02 | 10 | - 71* | - 14 |
| 13. Perceived Discrimination | - 34 | -14 | - 01 | - 44 | - 40 |
| 14. Self-Respect and Compassion for Others | - 24 | -26 | 73* | - 10 | - 08 |
| 15. Distrust of Work Institutions | - 07 | -26 | 03 | - 73* | - 11 |
| 16. Affective Acceptance of Work Atmosphere | 53 | -49 | 40 | 53 | 36 |

* P≤.05; * P≤.01

(Decimal points omitted) (continued)

TABLE 58 - Continued

| PREDICTOR VARIABLES | CRITERION VARIABLES | | | | |
|---|---|---|---|---|---|
| | FACTOR I General Work Performance | FACTOR II Social Adaptability | FACTOR III Conscientiousness | FACTOR IV Craftsmanship | FACTOR V Compliance |
| 17. Feelings of Hostility | - 43 | 31 | 17 | - 90** | - 35 |
| 18. Readiness for Training | - 74* | - 27 | 42 | - 12 | - 65 |
| 19. Disinclination to Leave Job | - 11 | 25 | 06 | 14 | 30 |
| 20. Positive Perception of Supervisor | 19 | - 24 | 01 | 66 | 30 |
| 21. Wage Dissatisfaction (1) | - 72* | - 21 | 17 | 20 | - 50 |
| 22. Dissatisfaction with Rule Changes | - 17 | - 11 | 01 | - 54 | - 45 |
| 23. Readiness for Upgrading to Supervisory Position | - 18 | - 46 | - 50 | 37 | - 63 |
| 24. Occupational Self-Confidence | 47 | 07 | - 41 | 52 | 36 |
| 25. Job Dissatisfaction | 24 | - 08 | - 02 | - 31 | - 17 |
| 26. Readiness for Upgrading | - 21 | - 34 | - 48 | 41 | - 52 |
| 27. Pessimism re Civil Rights Progress | - 35 | - 05 | - 07 | - 29 | - 21 |
| 28. Wage Dissatisfaction (2) | - 73* | 04 | 31 | 01 | - 63 |
| 29. Dissat. with Perceived Lack of Opportunity | 29 | - 37 | 13 | 30 | 32 |
| 30. Feelings of Despair (2) | - 31 | 02 | 10 | - 71* | - 14 |
| 31. Distrust of Institutions | - 10 | - 15 | 16 | - 76* | - 15 |
| 32. Frustration with Hostility | - 62 | 64 | 05 | - 69* | - 31 |
| 33. Perceived Unfairness of Management | - 18 | 17 | 01 | - 32 | - 24 |
| 34. Resigned Acceptance of Company | 28 | - 07 | - 13 | - 43 | - 14 |
| 35. Impatience with Civil Rights Progress | - 37 | - 22 | 11 | - 53 | - 59 |
| 36. Risk-Taking Proclivity | - 19 | 18 | - 26 | - 23 | 05 |

not been pre-tested, thus, reducing the N to 9). In spite of the small sample, several relationships reached statistical significance and, in general, some clear trends emerged which warrant brief commentary here and suggest that this aspect of the study should be pursued further.

Of perhaps the greatest significance, as far as the supervisors are concerned, is Factor I, "General Work Performance," which, in fact, controls the largest percentage of variance of all the factors described in Table 57. The high positive correlation between the workers's age and his supervisor's evaluation of his general work performance could, of course represent a valid relationship, especially since older workers would be more likely to be experienced in performing tasks required of them in a manufacturing firm. However, the lack of a significant relationship between age and supervisory ratings on Factor IV, "Craftsmanship," and the lack of a systematic relationship between months on present job and "General Work Performance," together with the significant negative correlations between the supervisors' ratings on "General Work Performance" and various measures of wage dissatisfaction expressed by the workers on the pre-test (i.e. variables 14, 15, 25 and 32) suggest the possibility of another interpretation and cast some doubt on the validity of supervisory ratings. As some of the results which we have presented earlier suggest, older workers tend to exhibit a greater acceptance of the status quo, whereas younger workers tend to hold attitudes which are more negative or critical of "the system." With this in mind, it is quite possible that supervisors tend to give more favorable ratings to older workers who are more like themselves and less likely to complain about conditions or, in some other way, "upset the applecart." Furthermore, since the older worker is more accepting of the status quo, he represents no threat to the supervisor as competition for the supervisory position, whereas the younger worker, who, as we have shown, expresses significantly more "Readiness for Training" as well as other feelings and attitudes which correlate positively with "Readiness for Upgrading to Supervisory Position," may present such a threat (real or imagined) to the supervisor. If the foregoing is true, the validity of supervisory ratings as adequate criterion variables is open to serious question. This is all the more serious a problem to the extent that first-line supervisors have any influence, direct or indirect, over the selection of workers for training programs. As the high negative correlation with variable 22, "Readiness for Training," shows, the supervisors in our sample tended to give lowest ratings on "General Work Performance" to those workers who expressed the greatest "Readiness for Training." Age and other objectively irrelevant factors are obviously major determinants in the supervisors' judgement. This is consistent with other findings which we presented earlier as well as with some of the other correlational relationships which may be seen in Table 58.

This part of the study, although only pilot in nature, has shown a number of trends, many of them statistically significant, which indicate that more research attention should be focused upon supervisory personnel. Their attitudes and judgements, which are likely to permeate their relationship with the workers whom they supervise, may be as important, if not more important, determinants of the long-range success or failure of manpower training programs.

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## IV. SUMMARY

The need for training programs, not only for unemployed, but also for the underemployed, low-skill, low-wage workers in our economy, is clearly recognized by those concerned with manpower problems, as well as by those concerned with the related social problems. This need is particularly urgent in urban areas, where members of minority groups are disproportionately affected by both unemployment and underemployment.

Correspondingly important is the need for research in this area to help guide our practical efforts. Disturbingly little academic research has focused on the subject population of the low-skill, low-wage worker, and even less has done so in connection with manpower training programs. Moreover, training programs themselves have seldom carried out research that would provide an adequate base for a descriptive analysis of the subjects with which they were dealing, much less provide a systematic analysis of the effects of training upon the trainees. Recognizing this problem, the Experimental and Demonstration project carried out by SAI during the years 1966-68 specifically included provisions for such research.

Given the relative lack of previous research findings in this area, our research efforts have been somewhat exploratory in nature. This was particularly true for the first year of the project (1966-67). During the year 1967-68, we attempted not only to conclude the exploratory research begun in the previous year, but to expand the research effort beyond the purely descriptive phase to a more systematic attempt to measure the effects of training. Still, the original intent of the study remained essentially the same, i.e. to describe low-wage, low-skill workers within the context of the work environment and to develop techniques to measure the effects of SAI's skill training program upon the participants. In addition, we conducted a pilot study aimed at identifying the variables which are predictive of trainee success. Such predictor variables are not developed for use in trainee selection in the classical sense, but rather as an aid in determining the content and emphases of future training programs.

Thus, the three principal foci of this research were:

1) a descriptive analysis of the subjects,
2) an analysis of the effects of the training program, and
3) an analysis of variables bearing on trainee selection and success.

Our data base was derived from interview schedules containing questions concerning demographic and other background variables, as well as questions relating to reported behaviors, aspirations, perceptions, attitudes and values of the subjects. The interviewees were low-skill, low-wage employees and their first-line supervisors from seven hospitals and four manufacturing firms in the New York metropolitan area. A total of 810 interview protocols, consisting of 437 employee and 91 supervisor pre-tests and 229 employee and 53 supervisor post-tests, were collected.

Although we collected data on both employees and their first-line supervisors, more detailed analyses were conducted with the employee data. This was both because of the main focus of the study, which was on the low-wage worker and his response to High Intensity Training, and because of the relatively large number of employee interview protocols which we were able to gather.

## Subjects and Their Characteristics

Table 1 (p. 38) presents a detailed breakdown of the ethnicity and sex of employees by organization. Approximately 28% of the employees are White, 60% Negro, 11% Puerto Rican, and less than 1% "Other". However, marked deviations from this distribution exist within the various organizations. Table 2 (p. 40), presenting the same information for supervisors, shows a somewhat different ethnic and racial breakdown, with 57% of supervisors being White, 36% Negro, 7% Puerto Rican and 0% "Other".

The mean weekly take-home pay for employees varied from $55. to $83. When one considers the fact that most of the employees in our sample were in their 30's and early 40's and had families to support, and when one also considers the high cost of living in New York City, the degree of economic hardship that the low-skill, low-wage worker has to cope with becomes very clear indeed (see Table 3, p. 43).

The employees' mean length of time on their present job was found to be 5½ years, which indicates a very high degree of employment stability. The relationship between this relatively long period of time on present job and the low weekly take-home pay is quite striking. The original concern of the project that many unskilled workers are trapped in their jobs at the lowest occupational level, receiving minimal wages which do not cover basic living expenses, seems to be reflected in these data obtained from the employees in our sample.

## Formal Education

We were interested in comparisons between employees and supervisors with respect to mean years of formal education completed. The mean difference between employees and supervisors from the seven hospitals is 2 3/4 years, with supervisors having the higher level of education. However, the mean difference in the four manufacturing firms is only 1 3/4 years. An anomalous case exists in the cases of Hospitals A and G, where the supervisors studied were Head Nurses. A considerably higher level of education is required to become a Registered Nurse (approximately three years post high school). However, this education is primarily of a professional and technical nature and is not directly related to the supervisory function. Thus, when we adjust for this anomaly, by removing the Head Nurses from the total, the difference between supervisors and employees in terms of mean years of formal education completed is only 1 1/3 years. Although this difference is still statistically significant, it is nonetheless rather small when one considers the differential prestige and benefits associated with the position of supervisor compared with that of the low-wage, low-skill employee. These findings indicate that differences in formal education do not necessarily constitute a major obstacle to the upgrading of low-skill employees to higher positions.

We were also interested in comparing mean years of formal education completed by employees in terms of differences in their racial or ethnic background. The results showed that the White employees in our sample had completed a mean of 9.36 years of formal education compared with the Negro employees' mean of 10.10 years. This difference is statistically significant (p $\leq$ .01) and lends additional support to the findings by Kahn (1964) and others which indicate that, for identical levels of education, Negro workers have lower level jobs and/or earn less than their White counterparts or, as our data show, for a given job and/or wage level, Negro workers have a higher level of education than do Whites. Our data are even more striking when one considers that it comes from New York City, which is considered to be freer of racial discrimination in the area of employment than other areas of the United States. There were no significant differences between White and Puerto Rican workers with respect to years of formal education completed.

## Job Search Behavior

Additional background information which we obtained from our subjects related to their job search behavior, i.e. to what extent they had used various means of finding a job in the past. We were interested in differences between employees and supervisors as well as differences among employees based on racial or ethnic identification, age, sex and length of residency in New York City.

We expected that supervisors would make greater use of formal channels of job search behavior and employees greater use of informal channels. Our data reveal, however, that employees use almost all of the means, formal and informal, to a greater extent than do supervisors. Possible explanations for this are 1) that employees change place of employment more frequently than do supervisors (supervisors are more likely to have job tenure) and 2) that supervisors are more likely to have obtained their present position through promotion, whether vertical or lateral, within the organization.

Similar to the findings of the employee and supervisor comparison, it was found that Negro employees utilized almost all means of job search behavior more frequently than did White employees. The question of "Going to a Private Employment Agency" (see Table 13-e, p. 80) differentiated most significantly between Negro and White employees (p $\leq$ .001), indicating the possibility of some form of "exploitation," since such private agencies typically charge a fee to the applicant. (Our findings, which suggest that Black employees have to "try harder" to get a job, are quite consistent with the finding reported earlier that Negroes have a higher level of education than White workers for the same job level). A widely held belief, shared by many White employers, is that Black workers simply change jobs more frequently than do White workers, thus constituting an "unstable work force." If this were true it might explain the above finding that Black workers use most means of job search behavior more frequently than do their White counterparts. However, when we tested this we found no significant differences between Negro and White workers with respect to frequency of job changes (see Tables 22, 24 and 26, pp. 108-110).

A close inspection of our data suggests that discrimination may be what is operating here. When the "yes" categories (i.e., "Yes, and landed a job" and "Yes, but didn't land a job") are compared in response to the question of use of a given method of job search behavior, Whites, in many cases - some of which are statistically significant - land jobs more frequently than Blacks (see Tables 13a-13i, p. 78ff). One striking reversal of this trend appears in Table 13-d, p. 79, "Registering at the Unemployment Office." Here we see Negroes significantly more successful than Whites at "landing a job" ($\chi^2 = 4.59$; $p \leq .05$). This could mean that the United States Employment Service and the New York State Employment Service engage in "negative discrimination," i.e. give preferential treatment to Negro applicants. However, an alternative explanation lies in the possibility that Black applicants may be more "pressured" into accepting any position offered, regardless of its desirability. Further research must be conducted before this question can be answered conclusively.

Puerto Rican workers, like Negro workers, report greater use of almost every method of job search behavior than do White workers (see Tables 15a-15i, p. 90ff). Many of the reasons for this may be the same as those put forth to explain differences in Negro and White employees' job search behavior. However, it should be borne in mind that, although both Blacks and Puerto Ricans have similar problems in finding employment in a White dominated society, there may be important differences between these two groups; again, further research in indicated in this area.

When comparisons were made between employees based on age, sex differences and length of residency in New York City, the following results emerged: 1) Employees over 25 years of age used most means of job search behavior more than employees 25 and under, as might have been expected as a reflection of the older workers' greater length of time in the labor force. 2) Males reported greater usage of all means than did females; this is consistent with the generally greater labor force participation of male workers. 3) Formal means of job search behavior were used more frequently by longer-term residents who, presumably, have greater familiarity with employment resources of the City. In light of the high rate of migration of low-skill workers into New York City, this finding may have certain policy implications; it would obviously be useful to provide further mechanisms (or improve existing ones) designed to familiarize these workers with formal channels of employment opportunity.

## Occupational Mobility

As we mentioned earlier, our data show no significant differences between Black and White workers in terms of frequency of job changes, tending to disprove beliefs to the contrary. As a matter of fact, there are not only no significant differences between the Black and White workers in our sample in terms of frequency of job changes during the past year preceding the interview, but such differences fail to materialize even when we compare average frequency of job changes over the past five years and over the past ten years.

However, when we look at vertical mobility, in terms of a two-digit numerical code based on the DOT,[21] we find that White workers - while showing no greater occupational mobility in terms of frequency of job changes - showed a highly significantly greater degree of upward mobility when compared with Black workers ($p \leq .001$). Furthermore, this difference in upward mobility is highly significant both when comparing the subjects' mobility score from previous job held to the present one and when comparing the average degree of mobility from the previous three jobs held to the present one; in both cases the Black workers' degree of vertical mobility is close to zero.

The Puerto Rican workers in our sample likewise show no significant differences in frequency of job changes when compared with

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[21] Dictionary of Occupational Titles, op. cit.

White workers. Unlike the Black workers in our sample, the Puerto Rican workers do not differ significantly from the White workers in terms of upward mobility when comparing previous job held to present job. However, when comparing average occupational mobility scores from the previous three jobs held to the present one, the Puerto Rican workers show significantly less upward mobility than their White counterparts. This suggests that many Puerto Ricans may have experienced downward mobility in some of their previous job changes (possibly those experienced after migration from Puerto Rico).

In summary, our data show that, although minority group workers show the same frequency of job changes as White workers, they have failed to benefit from the upward job mobility customary in the world of work and experienced by the White workers in our sample. This confirms the initial major assumption underlying the entire operation of SAI's efforts, namely that many low-skill, low-wage workers, especially Negroes and Puerto Ricans, have become trapped in their jobs at the lowest levels of the occupational ladder.

## Perceptions of Employees and Supervisors

The Employee and Supervisor Interview Schedules contained corresponding series of questions designed to compare the employees' expressed interest in "a better job at more pay" and in a hypothetical training program, with their supervisors' perceptions of the degree of employee interest in these areas. The data show that employees are significantly more interested in getting a better job at more pay than their supervisors think they are ($p \leq .001$, see Table 32, p. 118) even if they had to take on more responsibilities ($p \leq .001$, Table 34, p. 120), and even if they had to leave the people they work with ($p \leq .05$, Table 36, p. 122). Employees' general interest in a training program is also significantly greater ($p \leq .01$, Table 38, p. 124) than their supervisors perceive it to be. Employees express interest in such a program even if it means doing some studying at home; again, their supervisors significantly underestimate the employees' interest.

A third set of corresponding questions for both employees and supervisors was designed to compare the employees' perceptions of their supervisors with the supervisors' perceptions of how their workers see them. Our data indicate that differences do, indeed, exist between supervisors' and workers' perceptions. Table 43, p. 128, exemplifies how many supervisors fail to perceive just how negatively they are regarded by their workers. It is also interesting to note that in the case of other items, while differences between the perceptions of the two groups are not significant, an inspection of the actual means shows that the workers perceive the supervisors in a rather negative fashion and the supervisors realize that they are in fact perceived in this negative way. Both types of problems and how they are to be dealt with are obviously important issues to be taken up in the training of supervisory personnel.

## Preliminary Analyses of Attitudinal Variables

The interview schedule contained a large number of questions which may be considered attitudinal in nature. Two considerations make it advisable in such a case to perform preliminary analyses aimed at reducing this mass of data. First, it is extremely difficult to inspect all possible inter-relationships of hundreds of items with each other. One hundred and fifty items, for example, would yield a correlation matrix of 22,500 correlation coefficients. A second consideration, however, is the fact that single scale items are notoriously unreliable. Through the use of factor analysis it is possible to summarize a large correlation matrix by finding clusters of items that tend to "hang together." When the highest loading items on such a cluster or factor are taken to form a composite score, one has then not only reduced the number of variables to be dealt with, but one has isolated the dimensions that are presumably relevant, given the set of items and the sample of subjects with which one is dealing. It can be demonstrated that such composite scores have much greater reliability than do responses to single items.

One set of 54 questions on the Employee Interview Schedule was designed to tap a variety of general attitudinal and personality variables. The responses to these questions were obtained on an ordinal scale varying from "strongly agree" to "strongly disagree." This set of items was factor analyzed and yielded the following six factors:

| | |
|---|---|
| Factor I | Feelings of Despair |
| Factor II | Perceived Discrimination |
| Factor III | Self-Respect and Compassion for Others |

| | |
|---|---|
| Factor IV | Distrust of Work Institutions |
| Factor V | Affective Acceptance of Work Atmosphere |
| Factor VI | Feelings of Hostility |

The remaining 96 questions from the Employee Interview Schedule which could possibly form roughly ordinal scales were then subjected to item analyses and exploratory correlational and factor analyses. A number of the items had to be rejected because they showed no variance and did not discriminate between subjects. In this manner the number was reduced to 48, and these 48 items were then subjected to a factor analysis. The following seven factors emerged from this analysis:

| | |
|---|---|
| Factor I | Expressed Readiness for Training |
| Factor II | Disinclination to Leave Job |
| Factor III | Positive Perception of Supervisor |
| Factor IV | Wage Dissatisfaction |
| Factor V | Dissatisfaction with Rule Changes |
| Factor VI | Expressed Readiness for Upgrading to Supervisory Position |
| Factor VII | Occupational Self-Confidence |

The items which make up these two sets of factors are presented in Tables 46 and 47, p. 139ff and p. 146ff.

A number of interesting and significant inter-relationships were found among the attitudinal variables described by the factors listed above and between these variables and biographical variables. An inspection of the intercorrelations among the biographical variables reveals that education is negatively correlated with age, meaning that younger workers tend to have more education than older workers. Education is positively correlated with weekly take-home pay, meaning that those workers with a higher level of education also tend to have a higher weekly take-home pay.

When biographical variables were intercorrelated with attitudinal variables, the following relationships were found to exist: Age was found to be negatively correlated with "Feelings of Despair," "Feelings of Hostility" and "Perceived Discrimination," that is to say younger workers express more of such feelings than do older workers. "Affective Acceptance of Work Atmosphere" is positively correlated with age, indicating a greater acceptance of the work situation, particularly the department in which they work, on the part of relatively older workers. The preceding findings seem to present a picture of older workers having accommodated somewhat more to the "system" as it is. This does not, however, mean that older workers are necessarily "better," nor, on the other hand, does it mean that they should, in any way, be disfavored in selection for a training program. What our findings do indicate is that, while many of the seemingly negative variables correlated negatively with age, several quite positive variables also correlated negatively with age. For example, "Readiness for Training" correlates negatively, to a significant extent, with age, indicating that younger workers express greater readiness for training. Younger workers also have a more "Positive Perception of Supervisor" than do older workers.

A study of the many interrelationships among the variables leads us to three general conclusions which we consider of particular relevance to the broad questions of trainee selection and the planning and implementation of training programs:

1. Some attitudinal and personality characteristics of workers which may, at first glance, seem generally negative, or indeed "negativistic," may be considerably more positively related to "Readiness for Training" and related dispositions than one might assume.

2. Furthermore, many of these seemingly negativistic attitudes, held primarily by younger workers, are positively related to our measure of "Positive Perception of Supervisor." Thus, younger workers hold attitudes which are more negative or critical of "the system," indicating a lesser willingness to acquiesce and accept the status quo than their older, more resigned co-workers. However, their criticism is directed primarily against the inequities and frustrations which are part of the reality they experience; it is not focused on their immediate supervisor and does not preclude a positive attitude toward training and upgrading.

3. Some seemingly "positive" attitudes which could leave a favorable impression, and possibly predispose an employer or trainer to give preference in trainee selection, may show no, or even a significant negative relationship to "Readiness for Training." For example, in Table 50 (p. 167), "Affective Acceptance of Work Atmosphere" shows no significant relationship to "Readiness for Training" or "Readiness for Upgrading to Supervisory Position." "Occupational Self-Confidence," on the

other hand, shows a significantly negative relationship to both "Readiness for Training" and "Readiness for Upgrading to Supervisory Position." Although it would seem that "Occupational Self-Confidence" is a characteristic which would be desirable to have in potential trainees, the empirical evidence presented here shows fairly clearly that subjects who, in a pre-test are high on this factor (as operationalized by the questions used to obtain a score for this factor - see Table 47, p. 151), express significantly less "Readiness for Training."

## An Analysis of Change

One of the main goals of the study, in addition to providing a descriptive analysis of low-skill, low-wage workers, was to develop techniques to measure the effects of SAI's skill training programs on the participants. The results of the analysis of change were determined by comparing the responses from four groups of subjects, each of which underwent a unique combination of conditions, as summarized in Fig. 3. Group 1 experienced pre-testing and training; Group 2 experienced pre-testing but no training; Group 3 experienced training and no pre-testing; Group 4 experienced neither pre-testing nor training. However, all four groups received the post-test; and it is these post-test results which provided the input for the analysis of change. The statistical technique used in this procedure is

FIGURE 3

COMBINATIONS OF CONDITIONS UNDERGONE BY
FOUR GROUPS IN ANALYSIS OF CHANGE DESIGN

| | Training | No Training |
|---|---|---|
| Pre-Test | (1) | (2) |
| No Pre-Test | (3) | (4) |

referred to as analysis of variance and the experimental design described by Fig. 3 is referred to as the Solomon Four-Group Design. The sources of variance in which we are interested are Training, Pre-Testing and the interaction between Training and Pre-Testing. The purpose of this analysis is to enable us to determine whether differences which appear can be attributed to Training or whether they may, instead, be due to the effect of Pre-Testing or to an interaction effect between Training and Pre-Testing. It is very important that we be able to tease out these differential effects if we wish to accurately assess the effect of Training alone and be able to generalize our findings to an unpretested population. Of course, for many variables, particularly those that may be regarded as personality variables, there were no main effects of either Training, Pre-Testing or an interaction of the two. Such variables are more stable and not likely to be changed to a demonstrable extent in such a short period. On the other hand, there were some changes in some of the general attitudinal factors and particularly in several of the factors directly relating to the work situation.

Table 55-b (p. 194) presents a summary of the analysis of variance results based on the variable of "Perceived Discrimination" (Factor II, Table 46, p. 140). Here we see a clear-cut main effect of Training. This means that employees who have undergone training show a greater amount of "Perceived Discrimination" on the post-test than employees who have not undergone training. Although this finding may, at first glance, seem unexpected, there is a very likely explanation for it. Although most of the trainees were minority group members, many of them may have been somewhat inhibited in the interview situation in their expression of feelings of discrimination, especially when the interviewer was White, as was often the case. During the training sessions, however, the trainers, many of whom were minority group members themselves, encouraged the trainees to be aware of their feelings and to express them more openly; at the same time, they encouraged them to do something about the problems they perceived and provided ways of doing so via job-related skill training and training in human relations skills. It may be worthwhile to note at this point that, in our analysis of the relationships among variables, "Perceived Discrimination" was significantly positively related to "Readiness for Upgrading to Supervisory Position" and "Positive Perception of Supervisor," indicating that such "awareness" is more likely to be associated with motivation in the direction of constructive upward mobility in the economic system. Thus, the finding that SAI's training program leads to an increase in "Perceived Discrimination" is not only not surprising, but it is not at all undesirable.

Table 55-e (p. 196) presents the analysis of variance results for the variable "Affective Acceptance of Work Atmosphere," (Factor V, Table 46, p. 142). Training alone was found to have a quite significant effect on this variable ($p \leq .01$); however, the interaction effect between Pre-Testing and Training had an even more significant effect ($p \leq .001$). This suggests that, through the collaboration of trainers and researchers, not only would it be possible to constantly improve training programs on the basis of research results, but it would also be possible to incorporate into training programs those aspects of pre-testing which have been shown to provide a "booster" effect in accomplishing the goals of training.

Table 56-a (p. 204) presents the analysis of variance results for the variable "Positive Perception of Supervisor." Both Pre-Testing and Training account for a significant percentage of variance ($p \leq .05$), with no interaction effects occurring. However, an inspection of the cell means reveals that the effects are in opposite directions. Training leads to an increase in "Positive Perception of Supervisor," while Pre-Testing leads to a decrease. The significant increase in the subjects' mean response on this variable as a function of training is, of course, an intended effect of our High Intensity Training program, particularly those aspects emphasizing human relations skills. The lowering of the score on this variable, as a function of pre-testing, is an unintended effect but one which requires explanation. The probable explanation of this finding may be the following: Many workers have latently negative perceptions of their supervisors, but may, for a number of reasons, be disinclined to reveal these to the interviewer in the pretest. The interview, however, heightens the saliency of these attitudes. At the time of the post-test, when the same questions are asked again, not only has the saliency of the attitudes toward the supervisor been heightened, but the interviewee may also have developed greater "trust" in the interviewer and be more willing to reveal his "real" feelings. Thus, this finding, though unexpected, should be taken into consideration if we wish to fully understand the relationship between employees and their supervisors.

Table 56-b (p. 204) presents the analysis of variance results for the variable "Wage Dissatisfaction." An inspection of the cell means indicates that Training leads to a decrease in "Wage Dissatisfaction," especially when the two groups who have not undergone Pre-Testing are compared. This is not surprising since a built-in component of the training program is a wage increase of 8 - 10% upon completion of the program. However, there is also a significant interaction effect between Pre-Testing and Training indicating that Pre-Testing may be having an indirect influence.

## Predictive Validity: A Pilot Study

In this part of the study we were interested in the question of pre-test variables as predictors of later trainee success on the job. Time and funding considerations limited us in the collection of this data to a very small number of subjects, so that this aspect of the study must be considered strictly exploratory in nature. The value of this pilot study lies in establishing a procedure for studying predictive validity when more extensive data of this sort can be collected.

Our interest in predictive validity is directed not so much toward trainee selection as it is toward predictive validity as a means by which to learn which characteristics, attitudes, etc. are predictive of trainee success; we can then be in a position to design more effective training programs which will seek to develop these characteristics in the trainees. Our approach to this issue is distinctly different from that which underlies much traditional industrial training. The use of so-called "aptitude testing" in the traditional industrial setting, which emphasizes exclusion rather than inclusion, is questionable not only from an ethical point of view, but is of dubious validity from a purely statistical point of view; even the most widely used "standard" measures in personnel selection show far from perfect validity, as Fleischman (1967), among others, has pointed out. Moreover, when tests are involved which have been standardized on White middle class subjects and are subsequently used to test members of minority groups, the probability of accurate prediction becomes even more questionable (Kirkpatrick et al., 1968).

After an extensive review of the literature concerning performance appraisal and other types of criterion measures used to establish the predictive validity of pre-test items, a set of 21 rating scales was selected for inclusion in our study. Eleven trainees at Manufacturing Firm W were rated on these 21 items, both by supervisors and by the trainer. On the basis of these 22 observations, the 21 variables were then factor analyzed and yielded the following five, clearly interpretable, factors:

| | |
|---|---|
| Factor I | General Work Performance |
| Factor II | Social Adaptability |
| Factor III | Conscientiousness |
| Factor IV | Craftsmanship |
| Factor V | Compliance |

The items which make up these factors are presented in Table 57 (p. 214ff).

We then obtained composite scores for each subject on these five factors and correlated these with pre-test measures, including both biographical variables and composite scores on attitudinal variables. Table 58 (p. 220) presents this matrix of correlations between the five criterion variables and 40 selected pre-test variables. Due to the very small sample, the magnitude of the correlation coefficient required for statistical significance was very high. In spite of the small sample, several relationships reached statistical significance and, in general, some clear trends emerged which warrant brief commentary here and suggest that this aspect of the study should be pursued further.

Of perhaps the greatest significance, as far as the supervisors are concerned, is Factor I, "General Work Performance," which, in fact, controls the largest percentage of variance of all the five factors. The high positive correlation between the worker's age and his supervisor's evaluation of his general work performance may represent a valid relationship, since older workers would be likely to be more experienced than younger workers. However, the lack of a significant relationship between age and supervisory ratings on Factor IV, "Craftsmanship," as well as the lack of a systematic relationship between months on present job and "General Work Performance," together with the significant negative correlations between supervisors' ratings on "General Work Performance" and various measures of wage dissatisfaction expressed by the workers suggest the possibility of another interpretation and cast some doubt on the validity of supervisory ratings. As some of the results which we have presented earlier suggest, older workers tend to exhibit a greater acceptance of the status quo, whereas younger workers tend to hold attitudes which are more negative or critical of "the system." With this in mind, it is quite possible that supervisors tend to give more favorable ratings to older workers who are more like themselves and less likely to complain about conditions or, in some other way, "upset the applecart." Furthermore, since the older worker is more accepting of the status quo, he represents no threat to the supervisor as competition for the supervisory position, whereas the younger worker, who, as we have shown, expresses significantly more "Readiness for Training" as well as other feelings and attitudes which correlate positively with "Readiness for Upgrading to Supervisory Position," may present such a threat (real or imagined) to the supervisor. If the foregoing is true, the validity of supervisory ratings as adequate criterion variables is open to serious question. This is all the more serious a problem to the extent that first-line supervisors have any influence, direct or indirect, over the selection of workers for training programs. As the high negative correlation with variable 22, "Readiness for Training," shows, the supervisors in our sample tended to give lowest ratings on "General Work Performance" to those workers who expressed the greatest "Readiness for Training." Age and other objectively irrelevant factors are obviously major determinants in the supervisors' judgement. This is consistent with other findings which we presented earlier as well as with some of the other correlational relationships which may be seen in Table 58.

This part of the study, although only pilot in nature, has shown a number of trends, many of them statistically significant, which indicate that more research attention should be focused upon supervisory personnel. Their attitudes and judgements, which are likely to permeate their relationship with the workers whom they supervise, may be as important, if not more important, determinants of the long-range success or failure of manpower training programs.

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# BIBLIOGRAPHY

A Study of Low-Wage Workers in Their Work Environment: Research Plan for the Period of October 2, 1967-April 30, 1968. A Working Paper. Tech. Mem. RES 119. New York: Skill Advancement, Inc., December 4, 1967.

Breaking the Barriers of Occupational Isolation: A Report on Upgrading Low-Skill, Low-Wage Workers; Findings and Recommendations for the City of New York. New York: Skill Advancement, Inc., July 1966.

Campbell, D.T. "Factors Relevant to the Validity of Experiments in Social Settings." Psychological Bulletin, 1957, 54, 297-312.

Cronbach, L.J. "Coefficient Alpha and the Internal Structure of Tests." Psychometrika, 1951, 16, 297-334.

Crowne, D.P. and Marlowe, D. The Approval Motive. New York: Wiley, 1964.

Davis, E.E. A Methodological Study of Behavioral and Semantic Differential Scales Relevant to Intercultural Negotiations. Urbana: Group Effectiveness Research Laboratory, Department of Psychology, University of Illinois, 1966.

Davis, E.E. and Jacobs, M. Methodological Studies of Authoritarian Ideology and Related Attitudinal and Personality Variables. Technical Report, Contract Nr.177-472, Nonr-1834(36). Urbana: University of Illinois, 1967.

Dictionary of Occupational Titles, (DOT) Volume I. Washington, D.C.: Bureau of Employment Security, Manpower Administration, United States Department of Labor, 1965 (3rd ed.)

Fisher, R.A. The Design of Experiments. Edinborough: Oliver and Boyd, 1935.

Fisher, R.A. and Yates, F. Statistical Tables for Biological, Agricultural and Medical Research. Edinburgh: Oliver and Boyd, 1963 (4th ed.)

Fleischman, E.A. (ed.) Studies in Personnel and Industrial Psychology (Revised Edition). Homewood, Illinois: Dorsey Press, 1967.

Gilpatrick, E. "A Proposed System of Occupational Coding." Monthly Labor Review, October 1968, 91, No. 10, 47-53.

Kahn, T. The Economics of Equality. New York: League for Industrial Democracy, 1964.

Kaiser, H.F. "The Varimax Criterion for Analytic Rotation in Factor Analysis." Psychometrika, 1958, 23, 187-200.

Kirkpatrick, J.J., Ewen, R.B., Barrett, R.S., and Katzell, R.A. Testing and Fair Employment. New York: New York University Press, 1968.

McNemar, Q. Psychological Statistics. New York: John Wiley and Sons, Inc., 1962.

Nunnaly, J.P. Tests and Measurements. New York: McGraw Hill, 1959.

Osgood, C.E., Suci, G.J. and Tannenbaum, P.H. The Measurement of Meaning. Urbana: University of Illinois Press, 1957.

Scheffé, H. "A Method for Judging All Contrasts in the Analysis of Variance." Biometrika, 1953, 40, 87-104.

Solomon, R.W. "An Extension of Control Group Design." Psychological Bulletin, 1949, 46, 137-150.

Upgrading the Low-Wage Worker: An Ergonomic Approach. 4 Vols. Tech. Mem. ADM 400. New York: Skill Advancement, Inc. August 1967.

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